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Genetic Stock Composition of Chum Salmon Harvested in Commercial Salmon Fisheries of the South Alaska Peninsula, 2022

by

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Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code		all standard mathematical signs, symbols and abbreviations	
deciliter	dL		AAC		
gram	g	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H _A
hectare	ha			base of natural logarithm	<i>e</i>
kilogram	kg			catch per unit effort	CPUE
kilometer	km	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	coefficient of variation	CV
liter	L			common test statistics	(F, t, χ^2 , etc.)
meter	m	at	@	confidence interval	CI
milliliter	mL	compass directions:		correlation coefficient (multiple)	R
millimeter	mm	east	E	correlation coefficient (simple)	r
Weights and measures (English)		north	N	covariance	cov
cubic feet per second	ft ³ /s	south	S	degree (angular)	°
foot	ft	west	W	degrees of freedom	df
gallon	gal	copyright	©	expected value	<i>E</i>
inch	in	corporate suffixes:		greater than	>
mile	mi	Company	Co.	greater than or equal to	≥
nautical mile	nmi	Corporation	Corp.	harvest per unit effort	HPUE
ounce	oz	Incorporated	Inc.	less than	<
pound	lb	Limited	Ltd.	less than or equal to	≤
quart	qt	District of Columbia	D.C.	logarithm (natural)	ln
yard	yd	et alii (and others)	et al.	logarithm (base 10)	log
		et cetera (and so forth)	etc.	logarithm (specify base)	log ₂ , etc.
Time and temperature		exempli gratia		minute (angular)	'
day	d	(for example)	e.g.	not significant	NS
degrees Celsius	°C	Federal Information Code	FIC	null hypothesis	H ₀
degrees Fahrenheit	°F	id est (that is)	i.e.	percent	%
degrees kelvin	K	latitude or longitude	lat or long	probability	P
hour	h	monetary symbols		probability of a type I error	
minute	min	(U.S.)	\$, ¢	(rejection of the null hypothesis when true)	α
second	s	months (tables and figures): first three letters	Jan,...,Dec	probability of a type II error	
Physics and chemistry		registered trademark	®	(acceptance of the null hypothesis when false)	β
all atomic symbols		trademark	™	second (angular)	"
alternating current	AC	United States		standard deviation	SD
ampere	A	(adjective)	U.S.	standard error	SE
calorie	cal	United States of America (noun)	USA	variance	
direct current	DC	U.S.C.	United States Code	population sample	Var var
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm	U.S. state	use two-letter abbreviations		
parts per thousand	ppt, ‰		(e.g., AK, WA)		
volts	V				
watts	W				

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PENINSULA, 2022**

by

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ABSTRACT

The South Alaska Peninsula commercial salmon fishery occurs in the Alaska Peninsula Management Area and is regulated by multiple management plans approved by the Alaska Board of Fisheries. Relatively large harvests of chum salmon in South Alaska Peninsula fisheries in recent years corresponding with small returns of chum salmon to Western Alaska raised concerns among stakeholders about the stock-specific harvests in South Alaska Peninsula fisheries. A new study was designed to estimate stock, age, and length compositions and stock-specific harvests in South Alaska Peninsula fisheries in 2022-2026. This report contains the results from the first year of this study. Genetic, age, and size samples were collected from June through August 2022, with temporal, spatial, and gear type stratification. A total of 14,869 samples of chum salmon were collected from 3 different port locations and in 28 spatiotemporal strata of commercial chum salmon fisheries of the South Alaska Peninsula in 2022. Of chum salmon sampled for length, lengths from mid eye to tail fork ranged from 396 mm to 720 mm and averaged 554 mm. A total of 12,810 of the chum salmon were successfully aged, with age-0.3 (63.9%) being the most common followed by age-0.4 (29.4%), age-0.2 (6.3%), and age-0.5 (0.05%). A total of 9,957 samples (1.2% of the total harvest) were selected and genotyped to represent the 2022 harvest using mixed stock analysis techniques. The Asia group was the largest contributor (345,896; 42.5%) to the total South Alaska Peninsula commercial chum salmon fishery, followed by East of Kodiak (137,503; 16.9%), South Peninsula (107,559; 13.2%), Coastal Western Alaska (103,798, 12.8%), and Chignik/Kodiak (72,050, 8.9%). No other groups contributed more than 5% of the harvest. These results provide the most current and comprehensive estimates of stock-specific harvest of chum salmon in the South Alaska Peninsula area, supplement previous studies, and should inform fishery management and regulatory process.

Keywords: South Alaska Peninsula, commercial fisheries, chum salmon, *Oncorhynchus keta*, stock composition, stock-specific harvest, mixed stock analysis, MSA, genetic stock identification, GSI

INTRODUCTION

Chum salmon *Oncorhynchus keta* are harvested alongside sockeye *O. nerka*, pink *O. gorbuscha*, coho *O. kisutch*, and Chinook *O. tshawytscha* salmon in commercial fisheries within the South Alaska Peninsula Management area (hereafter referred to as “South Alaska Peninsula”). The Alaska Department of Fish and Game’s (ADF&G) South Alaska Peninsula (southern portion of Area M) includes waters from Kupreanof Point west to Scotch Cap on Unimak Island and includes the Unimak District, Bechevin Bay Section of the Northwestern District (in June only), Southwestern District, South Central District, and Southeastern District (Figure 1).

The South Alaska Peninsula has approximately 224 salmon streams, with sockeye salmon found in 37, pink salmon in at least 204, chum salmon in 136, and coho salmon in 81 (Schaberg et al. 2019). Escapement levels are primarily monitored via aerial surveys using small fixed-wing aircraft.

Three management plans guide the ADF&G’s approach to managing salmon fisheries in this area annually: the *South Unimak and Shumagin Islands June Salmon Management Plan* (5 AAC 09.365), the *Post-June Salmon Management Plan for the South Alaska Peninsula* (5 AAC 09.366), and the *Southeastern District Mainland Salmon Management Plan* (5 AAC 09.360). Three gear types are fished in the South Alaska Peninsula fisheries: purse seine, set gillnet, and drift gillnet (Figures 2–4).

The South Alaska Peninsula fisheries include the June and post-June fisheries that vary in time and space for gear types. The South Unimak and Shumagin Islands June commercial salmon fisheries are in effect from June 6 through June 28. The South Unimak June fishery occurs in the Unimak and Southwestern Districts, a portion of the South Central District, and the Bechevin Bay Section of the Northwestern District (Figures 1–3). The Shumagin Islands June fishery includes the Shumagin Islands Section of the Southeastern District (Figure 1). The Post-June Salmon Management Plan for the South Alaska Peninsula covers all waters of the South Alaska Peninsula

management area (except the Southeastern District Mainland [SEDM]) from July 1 through October 31 (Figure 4). The Southeastern District Mainland Salmon Management Plan covers the Southeast District Mainland Section of the Southeastern District from June 1 to October 31.

In 2021, the largest harvests of chum salmon in the South Alaska Peninsula fisheries in more than 40 years, combined with dramatic decreases in returns of chum salmon to Western Alaska, renewed interest among Western Alaska stakeholders in investigating stock-specific harvests in South Alaska Peninsula fisheries. Historical records of the South Alaska Peninsula commercial fishery go back to 1908. From 2013 to 2022, the South Alaska Peninsula June Fishery annual harvest averaged 4,274,905 salmon and was composed of 8,318 Chinook, 1,582,548 sockeye, 2,898 coho, 2,164,263 pink, and 516,878 chum salmon (Table 1). In 2021, the South Alaska Peninsula June fisheries chum salmon harvest was unusually high, the highest in the time series dating back to 1979 (1,168,601; Table 1).

The large harvest of chum salmon in South Alaska Peninsula fisheries in 2021 occurred in a year that saw extremely poor returns of chum salmon to Western Alaska rivers. In Norton Sound, the commercial harvest of 6,410 chum salmon was the poorest since the record low harvests of the early 2000s and was 5% of the recent 5-year (127,343) average and just over 5% of the recent 10-year (118,411) average (Menard et al. 2022). In the Yukon River, an estimated 153,718 summer chum salmon were counted at the Pilot Station sonar ($\pm 16,149$, 90% CI; Jallen 2021), approximately 8% of the 2011–2020 average of 1,937,317 fish for the project. Cumulative summer chum salmon counts at the Pilot Station sonar were the lowest ever observed in the project's history (1995–2021), and as a result all commercial and subsistence salmon fishing remained closed for the entire season, and selective gear types were only open for non-salmon species (Ransbury et al. 2022). The drainagewide summer chum salmon run was approximately 160,135 fish, approximately 7% of the 5-year (2016–2020) average of 2,173,693 fish. For Yukon River fall chum, the drainagewide estimate of total run was 95,249, approximately 10% of the recent 20-year average (Ransbury et al. 2022). In the Kuskokwim River, the total cumulative CPUE index of 327 for chum salmon at the Bethel Test Fishery was the lowest observed on record, approximately 6% of the 2011–2020 average of 5,867 (Smith and Gray 2022).

Evidence of poor chum salmon returns throughout AYK continued in 2022. In Norton Sound, chum salmon returns in 2022 were well below the runs of the 2010s but were an improvement over very low returns in 2021. The commercial harvest of 31,249 was one-quarter of the recent 5-year average (118,262; Menard and Clark 2022). In the Yukon River, an estimated 463,806 summer chum salmon were counted at the Pilot Station sonar (with a 90% confidence interval of 438,989 to 488,623 fish; Jallen 2022), which was well below the historical median of 1.6 million fish from years with late run timing. The preliminary estimate of the 2022 fall chum salmon run size is 242,465 with an estimated escapement of 239,687 fish, a slight improvement over the record low run size in 2021 but still well below the historical average (Bonnie Borba, Division of Commercial Fisheries Biologist, ADF&G, Anchorage, December 21, 2022, personal communication). Commercial and subsistence fisheries targeting salmon, including chum salmon, remained closed again in the Yukon River in 2022. In the Kuskokwim River, chum salmon escapements have varied widely since 2018. Following above-average escapement in 2019, the 2020 chum salmon run was well below average, the 2021 chum salmon run was the lowest on record, and the 2022 chum salmon run was the second lowest on record. Exploitation from commercial harvest in the Kuskokwim Management Area has been limited due to Chinook and chum salmon conservation measures and the lack of a commercial processor in the last 6 years (Smith et al. 2022).

There is a long history of studies to determine chum salmon stock of origin in South Alaska Peninsula area. Various chum salmon tagging experiments have been conducted in the area over the last century. In 1923 the U.S. Bureau of Fisheries tagged chum salmon in July in the vicinity of Unga Island and Ikatan and Morzhovoi bays (Figure 4; Gilbert and Rich 1925). In June 1939 the bureau again tagged chum salmon in the vicinity of both South Unimak and Shumagin Islands (Shaul 2005). Tagging studies were conducted by the International North Pacific Fisheries Commission between 1956 and 1966, and 1 area of chum salmon releases was the offshore area of South Unimak Island in May and June (Brannian 1984). Chum salmon were tagged by the U.S. Fish and Wildlife service between June 15 and July 14, 1961, in the South Unimak and Ikatan Bay area (Figure 4; Thorsteinson and Merrell 1964). Other smaller chum tagging projects were conducted in the 1960s but unpublished (Shaul 2005). A large chum tagging project was conducted by ADF&G in June and early July 1987 around South Unimak and Shumagin Islands (Eggers et al. 1991). Other methods of determining stock of origin have been used in the modern era. An unpublished scale pattern analysis project was conducted in 1983 on June harvests of chum salmon in South Unimak and Shumagin Islands. From 1993 to 1996, genetic mixed stock analysis (MSA) techniques conducted by the Gene Conservation Laboratory (GCL) were used to determine stock of origin of chum salmon harvested in the South Alaska Peninsula commercial fishery in June (Seeb et al. 1997) and in July 1996 and 1997 (Crane and Seeb 2000). In general, these studies demonstrated a high abundance of nonlocal chum in June and early July.

The most recent and scientifically rigorous study, the Western Alaska Salmon Stock Identification Program (WASSIP), sampled catches from 2006 to 2009 as an objective measure of the stock of origin of chum and sockeye salmon caught by inshore commercial salmon fisheries of western Alaska (Eggers et al. 2011). Chum salmon sampled in 2007 to 2009 were subsequently analyzed for genetic MSA using a baseline developed for the study. The baseline reported stock compositions to 9 groups of populations (i.e., reporting groups) that were defined by a combination of stakeholder interest, population genetic structure, adequate representation of individuals and populations within reporting groups in the baseline, and expected contributions of reporting groups to catch samples. Identifying contributions from the large rivers and management areas of Western Alaska (i.e., Norton Sound, and the Yukon, Kuskokwim, and Nushagak rivers) in catch samples analyzed by WASSIP was a high priority for stakeholders. The Department collaborated on a concerted effort to identify genetic markers that could provide the population genetic structure to identify those groups of populations in catch samples (Seeb et al. 2011a), and selected markers to maximize population genetic structure between rivers and management areas within Western Alaska (DeCovich et al. 2012a). Unfortunately, repeated baseline evaluation testing showed that the major rivers and management areas of Western Alaska could not be identified in MSA, and WASSIP was conducted with the following 9 reporting groups: Asia, Kotzebue Sound, Coastal Western Alaska (CWAK), Upper Yukon, Northern District, Northwestern District, South Peninsula, Chignik/Kodiak, and East of Kodiak (Figure 5; DeCovich et al. 2012b). This inability to distinguish among CWAK groups is not new (Beacham et al. 2009, Kondzela et al. 2002, Seeb et al. 2004). Recent attempts to break apart CWAK into smaller reporting groups with modern sequencing techniques have similarly been unable to identify the Yukon, Kuskokwim, and Nushagak rivers separately despite using thousands of genetic markers (McKinney et al. 2022).

Stock compositions and stock-specific harvests and harvest rates from WASSIP were reported in 2012 (Dann et al. 2012a; Habicht et al. 2012a; Munro et al. 2012; Templin et al. 2012). Summarizing across 2007–2009, the CWAK reporting group made up a majority of the chum salmon harvests in the June fishery (57%; Table 2), followed by Asia (25%) and East of Kodiak

(8%). South Peninsula dominated the post-June fishery average (70%), followed by Chignik/Kodiak (11%) and Asia (9%; Munro et al. 2012). Important aspects to understand when interpreting WASSIP estimates of stock-specific chum salmon harvests in South Alaska Peninsula fisheries are that the WASSIP experimental design (1) grouped harvests and samples among gear types, (2) included 5 temporal strata in the June fishery for most areas, (3) included 3 temporal strata in the post-June fishery for the Shumagin Islands, and (4) did not analyze harvests in the post-June fishery for the Unimak District. Although stock composition averages of 2007–2009 harvests may not be representative of recent harvests due to changes in relative abundance among reporting groups, prosecution of the fisheries, or marine survival or migratory behavior due to changes in ocean conditions, these estimates provide the most recent information regarding stock-specific harvests in South Alaska Peninsula fisheries. These data were used to guide a framework of the current study.

A new project was initiated by the Alaska Department of Fish and Game in 2022 with primary objectives to sample, genotype, and estimate the stock, size, and age composition of the major chum salmon commercial fisheries in marine waters of the South Alaska Peninsula where and when significant catches of salmon occur from 2022 to 2026 (Foster and Dann 2022). This report summarizes results of sampling and analysis of genetic tissue, size, and age samples from chum salmon of the commercial salmon fisheries of the South Alaska Peninsula from the first year (2022). We report stock, length, and age compositions, and stock-specific harvests.

OBJECTIVES

PRIMARY OBJECTIVES

1. Collect genetic tissue (pelvic fin) from chum salmon caught in the major South Alaska Peninsula fisheries over the 2022 fishing season from June to August.
2. Select subsamples of genetic tissues in proportion to catch within designated areas, gear types, and temporal strata.
3. Using genetic MSA techniques, estimate stock proportions and stock-specific harvests of chum salmon in the South Alaska Peninsula strata using reporting groups defined in WASSIP.
4. Estimate the age and length composition of chum salmon sampled from South Alaska Peninsula fisheries.

OVERVIEW

The primary objective of this study was to sample, genotype, and estimate the stock composition of the major chum salmon commercial fisheries in marine waters of the South Alaska Peninsula where and when significant catches of salmon occur (Table 3, Figures 1-4) in 2022. The June and post-June fisheries had different sample collection and analysis designs reflecting differences in their scheduled (June) and local escapement-based (post-June) management. The sample collection and analysis designs were described by Foster and Dann (2022) and are summarized in Table 3. We attempted to estimate stock compositions of harvests by gear type (seine and drift/set gillnet) separately due to anecdotal evidence that the 2 gear types selectively harvest fish of different ages, maturity, and stock of origin. We also analyzed harvests in the different geographic areas, Unimak and Southwestern Districts, and South Central and Southeastern Districts, separately as these 2 areas may harvest different stocks (Munro et al. 2012).

In general, designs called for 1 temporal stratum for MSA for each of the scheduled openings in the June fishery for each gear type with the following exceptions: 1) Because the first opening is for the set gillnet fleet only, seine and drift gillnet harvests will be represented by each of the last 4 scheduled openings. 2) Drift gillnet harvests in Unimak and Southwestern Districts are larger than set gillnet harvests in the South Central and Southeastern Districts and will be represented by 4 strata (1/opening) while 3) South Central and Southeastern Districts set gillnet harvests will be represented by a single stratum representing all 5 openings for a total of 13 strata for the June fishery (Table 3; Foster and Dann 2022).

Post-June harvests were to be represented by 5 temporal strata for seine and 4 temporal strata for gillnet for each geographic area, Unimak and Southwestern Districts, and South Central and Southeastern Districts, for a total of 18 area and temporal strata (Table 3; Foster and Dann 2022). We planned to group harvests of each geographic area into temporal strata that represent roughly equal harvests or temporal periods that represent distinct management time periods. Designated sampling areas encompass districts or partial districts as outlined in the fishery description below and are based on geographic location, harvest magnitude, and management discreteness, with consideration given to port delivery location.

FISHERY DESCRIPTION

The South Alaska Peninsula management area is divided into 4 districts: Unimak, Southwestern, South Central, and Southeastern Districts (Figure 1). The commercial salmon fishery season runs from June 1 to October 31, but a general distinction is made between the June and post-June fisheries. The vast majority of the harvest occurs between June and August, but fishing does often extend into September.

The June fishery of the South Alaska Peninsula occurs in the Shumagin Islands Section of the Southeastern District, the East and West Pavlof Bay Sections of the South Central District, the Southwestern District, the Unimak District, and the Bechevin Bay Section of the Northwestern District (Figures 1-3). Set gillnet gear is allowed in all areas (Figure 2), drift gillnet gear is allowed in the Bechevin Bay Section of the Northwestern District, the Unimak District, and portions of the Southwestern District (Figure 3), and purse seine gear is allowed in the Shumagin Islands Section, portions of the Southwestern District, the Unimak District, and the Bechevin Bay Section of the Northwestern District during the June fishery (Figure 2).

The post-June fishery of the South Alaska Peninsula can occur in all areas with the exception of SEDM, which has allocative restrictions related to the Chignik Management Area, and Dolgoi Island area (Figure 1) which has harvest limits through July 25. Purse seine and set gillnet gear is allowed throughout the area during the post-June fishery with the exception of the SEDM and Dolgoi Island areas. Drift gillnet gear is allowed in the Unimak District and the Ikatan Bay Section of the Southwestern District. For detailed description on this complex fishery, refer to the Area Management Report authored by Fox et al. (2021).

METHODS

FISHERY SAMPLING

Tissues to determine stock of origin were collected through temporally stratified sampling of the commercial harvest of chum salmon throughout South Alaska Peninsula fisheries during the 2022 season. Due to the varied nature of the June and post-June fisheries, temporal strata were defined

separately for the 2 time periods. The June fishery has a predetermined schedule including an initial opening for set gillnet gear only, followed by 4 openings for set gillnet, drift gillnet, and seine gear. The post-June fishery is opened based upon local pink and chum salmon escapement. A majority of the chum salmon harvest occurs in 2 geographic areas, the Southeastern and South Central Districts and the Unimak and Southwestern Districts; for purposes of this study these 2 major geographic areas that include 2 districts each were combined for area stratum representation. Temporal strata were defined by the 4 scheduled openings in June for seine and drift gillnet gear types, and all 5 scheduled openings for set gillnet gear were condensed in a single stratum. The post-June fishery temporal strata were defined by 3 time periods of harvest in July for all gear types. Additionally, there were 2 temporal strata in August (except only 1 temporal stratum for set gillnet).

Technicians (samplers) collected biological samples from the commercial salmon fishery of the South Alaska Peninsula. The samplers were based at processing facilities located in Sand Point, King Cove, and False Pass (Figure 1). Samplers obtained fish ticket information (both before and after) collecting samples to determine if the chum salmon were exclusively harvested from the area, gear, and time frame designated in the sampling plan. If fish ticket data were not available, the processing facility dock foreman or tender operator were interviewed. Once fish ticket information was available, the origin of the catch were confirmed. Fish selection was done without regard to fish size to ensure randomness.

Age and Length Sampling

The most common method of age determination in Pacific salmon is the analysis of the concentric rings (circuli) on the scale. Scales, when possible, were collected from the preferred area of each fish following the methods described by International North Pacific Fish Commission (1963) and Welander (1940). One scale per fish was collected and mounted on scale “gum” cards and impressions made on acetate/diacetate cards (Clutter and Whitesel 1956). Fish ages were assigned by examining scale impressions for annual growth increments using a microfiche reader fitted with a 48X lens following designation criteria established by Mosher (1968). Ages were recorded using European notation (Koo 1962), with a decimal separating the number of winters spent in fresh water (after emergence) from the number of winters spent in salt water. Length from mid eye to tail fork (METF) was measured to the nearest millimeter using aluminum measuring sticks. Sex of the fish was not determined as secondary sexual characteristics were not developed enough for accurate determination of sex (primarily in June) and inspecting gonads was not feasible.

Tissue Sampling

Tissue samples from chum salmon were collected from all fish selected for sampling. A piece of the pelvic fin was clipped from left side of the fish and placed onto a numbered grid on a numbered Whatman genetic card (WGC) following the procedures outlined in Foster and Dann (2022). All fishery sample information was recorded by the samplers on a form that paired tissue WGC barcode and grid numbers with age and length.

GENETIC ANALYSIS

Sample Selection

The number of strata and samples used to estimate stock-specific harvests were described in Foster and Dann (2022). Tissue samples were grouped into predefined gear-, area-, and temporal-specific

strata for the June fishery. These were the 5 regularly scheduled fishery openings. For the months of July and August, we attempted to divide harvests from each area-gear combination into roughly equal harvest totals so that each stratum represented roughly equal harvests. Within each stratum, we selected numbers of samples from each day to most closely represent that day's harvest contribution to the total harvest of the stratum. Target sample size for MSA was 380 and minimum sample size was 100.

Laboratory Analysis

DNA Extraction

We extracted genomic DNA from tissue samples using a NucleoSpin 96 Tissue Kit by Macherey-Nagel (Düren, Germany).

Genotyping

A multiplexed preamplification polymerase chain reaction (PCR) of the 96 screened single-nucleotide polymorphism (SNP) markers was used to increase the concentration of template DNA. Each reaction was conducted within a 10 μ L volume consisting of 4 μ L of genomic DNA, 5 μ L of 2X Multiplex PCR Master Mix (QIAGEN), and 1 μ L of 2 μ M unlabeled forward and reverse primers. Thermal cycling was performed on a Dual 384-Well GeneAmp PCR system 9700 (Applied Biosystems) at: 95°C held for 15 min followed by 16 cycles of 95°C for 15 sec, 60°C for 4 min, and a final extension hold at 4°C. The preamplification product was then diluted 1:10 in a 30 μ L volume consisting of 27 μ L of TE (10mM Tris (pH 8), 1mM EDTA) and 3 μ L of preamplification product.

We performed PCR using Standard BioTools 96.96 Dynamic Array Integrated Fluidic Circuits (IFCs), which systematically combine up to 96 assays and 96 samples into 9,216 parallel reactions. The components are pressurized into the IFC using the IFC Controller HX (Standard BioTools). Each reaction is conducted in a 7.2nL volume chamber consisting of a mixture of 20X Fast GT Sample Loading Reagent (Standard BioTools), 2X TaqMan GTXpress Master Mix (Applied Biosystems), Custom TaqMan SNP Genotyping Assay (Applied Biosystems), 2X Assay Loading Reagent (Standard BioTools), 50X ROX Reference Dye (Invitrogen), and 60-400ng/ μ L DNA. Thermal cycling is performed on a Standard BioTools FC1™ Cyclor using a Fast-PCR protocol as follows: a "Thermal-Mix" step of 70°C for 30 min and 25°C for 10 min, an initial "Hot-Start" denaturation of 95°C for 2 min followed by 40 cycles of denaturation at 95°C for 2 sec and annealing at 60°C for 20 sec, with a final "Cool-Down" at 25°C for 10 sec. The Dynamic Array IFCs were read on the EP1 System (Standard BioTools) after amplification and scored using Standard BioTools SNP Genotyping Analysis software.

Quality Control

We conducted quality control (QC) analyses to identify laboratory errors and to measure the background error rate of the genotyping process. The QC analyses were performed as a separate event from the original genotyping, with staff duties altered to reduce the likelihood of repeated human errors. The QC protocol consisted of re-extracting 8% of project fish and genotyping them for the same SNPs assayed in the original project. Laboratory errors found during the QC process were corrected, and genotypes were corrected in the database. Inconsistencies not attributable to laboratory error were recorded, but original genotype scores were retained in the database. Discrepancy rates were calculated as the number of conflicting genotypes divided by the total number of genotypes compared. These rates describe the difference between original project data

and QC data for all SNPs, and are capable of identifying extraction, assay plate, and genotyping errors. The overall failure rate was calculated by dividing the number of failed single-locus genotypes by the number of assayed single-locus genotypes. Assuming that the discrepancies among analyses were due equally to errors during original genotyping and during QC genotyping and that these analyses are unbiased, the error rate in the original genotyping was estimated as half the overall rate of discrepancies. This QC method is the best representation of the error rate of our current genotype production.

Statistical Analysis

Data Retrieval and Quality Control

Genotypes were retrieved from LOKI and imported into *R*¹. All subsequent genetic analyses were performed in *R* unless otherwise noted. Prior to statistical analysis, 2 analyses were performed to confirm the quality of the data. First, individuals were identified that were missing a substantial amount of genotypic data—that is, those individuals missing data at 20% or more of loci (80% rule; Dann et al. 2009). These individuals were removed from further analyses because their samples were suspected to have poor-quality DNA. The inclusion of individuals with poor-quality DNA might introduce genotyping errors into the mixture samples and reduce the accuracies of MSA. This method also identifies and removes samples from the wrong species.

The second quality control analysis identified individuals with duplicate genotypes and removed them from further analyses. Duplicate genotypes can occur from sampling or extracting the same individual twice and were defined as pairs of individuals sharing the same alleles in 95% or more of loci screened. The individual with the most missing genotypic data from each duplicate pair was removed from further analyses. If both individuals had the same amount of genotypic data, the first individual was removed from further analyses.

Estimating Stock Composition

We used the WASSIP baseline to estimate stock compositions. The baseline, described by DeCovich et al. (2012b), is composed of 32,817 fish from 402 collections representing 310 populations grouped into 9 regional reporting groups. Those reporting groups are Asia, Kotzebue Sound, Coastal Western Alaska (CWAK), Upper Yukon River, Northern District (Alaska Peninsula), Northwestern District (Alaska Peninsula), South Peninsula (Alaska Peninsula), Chignik/Kodiak, and East of Kodiak (Figure 5). Using the original WASSIP baseline we created a baseline file for use in the mixed stock analysis *R* package *rubias* (Moran and Anderson 2019). Similar to the original *BAYES* analysis package used in WASSIP, the *rubias* package is a Bayesian approach to the conditional genetic stock identification model based upon computationally efficient C code implemented in *R*. It uses cross validation and simulation to quantify and correct for biases in reporting group estimates.

We used the *R* package *rubias* to estimate fishery stock compositions. For each mixture analysis, a single Markov Chain Monte Carlo chain with 25,000 iterations was run. The first 5,000 iterations of the chain were discarded to remove the influence of starting values. The prior parameters for each reporting group were defined to be equal (i.e., a flat prior). Within each reporting group, the population prior parameters were divided equally among the populations within that reporting

¹ R Core Team (2021). *R*: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.

group. We sampled every tenth iteration to form posterior distributions from the single chain output. Stock proportion estimates and the 90% credibility intervals for each mixture were calculated by taking the mean, median, standard deviation, and 5% and 95% quantiles of the posterior distribution.

Stock Specific Harvest

We applied harvest totals associated with each stratum based upon fish ticket data current as of November 7, 2022. We calculated stock-specific harvest estimates in each stratum by multiplying the reported harvest from that stratum by its unrounded estimates of reporting group proportions (obtained from MSA). Results were rounded to the nearest fish.

Stratified Estimates of Stock Specific Harvest

Each stratum represented a unique combination of sampling period (i), area (j), gear type (k), and temporal strata within each sampling period (l) and each represented different harvest totals. Reporting of estimates may be combined based on specific combinations of temporal strata, areas, or gear types. We used a hierarchical design to stratify estimates first among temporal strata within an area/gear, then among gear types within an area, areas within months, to June and post-June fisheries, and finally to the South Alaska Peninsula as a whole (Table 4). Combined estimates were weighted by the harvest number of each stratum. Estimates of stock-specific harvest were derived by applying the stock-specific composition proportions (p_{ijkly}) to the stratum harvest C_{ijkl} .

$$C_{ijkly} = p_{ijkly} C_{ijkl}$$

The estimate ($\hat{C}_{ijkly}$) and distribution of stock-specific harvest for each reporting group (y) and component fishery (i, j, k, l) was obtained by Monte Carlo simulation. Here, B = 2,000 independent realizations of the reporting group-specific harvest ($C_{ijkly}^{(b)}$) drawn randomly from the joint distribution of the harvest ($C_{ijkl}^{(b)}$) and stock composition ($p_{ijkly}^{(b)}$) for each stratum

$$C_{ijkly}^{(b)} = p_{ijkly}^{(b)} C_{ijkl}^{(b)}$$

$$\hat{C}_{ijkly} = \text{median of the } B \text{ observations of } C_{ijkly}^{(b)}.$$

Note that the 90% credibility interval was determined by 5th and 95th quantiles of the B observations of $C_{ijkly}^{(b)}$. The median, 90% CI, mean, SD and CV of the stock-specific harvests were estimated directly from B observations of $C_{ijkly}^{(b)}$. Although tables provide both medians and means, figures and text describing results report medians as the measure of central tendency as stock composition estimates for many stocks are right-skewed near 0.

Generation of stock-specific catch distributions required an estimate of the distribution of each component. The distributions of the stock compositions ($p_{ijkly}^{(b)}$) were the Bayesian posterior distributions of stock proportions from the mixed stock analysis. The lognormal probability distribution for the harvest ($C_{ijkl}^{(b)}$) from each stratum used the harvests as the mean.

Commercial catches of salmon are reported on fish tickets and for many fisheries the numbers were based on converting weight of fish to number of fish using an estimate of average fish weight. We recognized that the number of fish harvested within a temporal stratum is not counted without

error; however, an actual assessment of error is not feasible at this time. Consequently, an ad hoc CV of 5% was applied to harvests of chum salmon, as was done in WASSIP.

Summary of Asia and CWAK Harvests

We summarized total harvests of chum salmon from the Asia and CWAK reporting groups as they were the 2 dominant stocks observed in the June fishery during the WASSIP years (Munro et al 2012). We calculated the ratio of Asia to CWAK harvests among strata and in the entire South Alaska Peninsula fishery as a whole to compare with results from WASSIP. We also tabulated how much of each stock's total estimated harvest in the South Alaska Peninsula fishery in 2022 was harvested in each stratum.

Estimating Age Compositions and Length Distributions by Fishery

We summarized age compositions and length distributions of chum salmon sampled from South Alaska Peninsula at multiple spatiotemporal levels as well as by gear type. These samples included those selected for MSA as well as all additional samples collected for age and length determination. We summarized age and length compositions for individual strata used in MSA, as well as by groupings of harvests representing different combinations of area, gear, and temporal periods of the South Alaska Peninsula. Estimated age compositions and associated variances of the population proportion was calculated using the methodology of Thompson (1992).

RESULTS

FISHERY SAMPLING

A total of 14,869 samples of chum salmon were collected in 28 spatiotemporal strata of commercial chum salmon fisheries of the South Alaska Peninsula in 2022 (Tables 5-6). Minimum sample sizes (100 fish) were achieved in all 28 spatiotemporal strata and reached or exceeded targeted goals (380 fish) in 20 strata. Details of the sampling for each temporal stratum sampled including sample dates, harvest dates, statistical areas, and port location are provided in Appendices A1-4.

Eight temporal strata (4 seine and 4 gillnet) were targeted for sampling in the Unimak and Southwestern Districts in the June fishery (Table 3). Target sampling objectives (380 fish) were achieved in all strata with the exception of the 4th June stratum for gillnet (drift) where harvest was low and only 223 samples were collected (Table 5). Details of the sampling (i.e., daily tabulation of harvest and numbers of samples collected and selected) for each temporal stratum sampled and selected for MSA in the Unimak and Southwestern Districts are provided in Appendices A1-2.

Five temporal strata (4 seine and 1 gillnet) were targeted for sampling in the Southeastern and South Central Districts in June (Table 3). Target sampling objectives (380 fish) were achieved in all strata (Table 6). Details of the sampling (i.e., daily tabulation of harvest and numbers of samples collected and selected) for each temporal stratum sampled and selected for MSA in the Southeastern and South Central Districts are provided in Appendices A3-4.

Six temporal strata (4 seine and 2 gillnet) were targeted for sampling in the Unimak and Southwestern Districts in the post-June fishery (Table 3). Target sampling objectives (380 fish) were achieved in 2 out of the 6 strata, a combined result of low harvest and harvest magnitude that skewed heavily to July 1 (Table 5). However, following the methods and standards used in WASSIP, sample sizes were still adequate for analysis (Templin et al. 2012). Details of the

sampling (i.e., daily tabulation of harvest and numbers of samples collected and selected) for each temporal stratum sampled and selected for MSA in the Unimak and Southwestern Districts are provided in Appendices A1–A2.

Nine temporal strata (5 seine and 4 gillnet) were targeted for sampling in the Southeastern and South Central Districts in the post-June fishery (Table 3). Target sampling objectives (380 fish) were achieved in 6 out of the 9 strata. A total of 365 and 348 samples were used for the 1st and 3rd gillnet strata in July, and 289 samples from the 2nd seine strata in August, primarily a result of low harvest (Table 6). Details of the sampling (i.e., daily tabulation of harvest and numbers of samples collected and selected) for each temporal stratum sampled and selected for MSA in the Southeastern and South Central Districts are provided in Appendices A3–4.

Age and Length Sampling

Of the 14,869 sampled chum salmon sampled for length, the smallest size encountered was 396 mm, the largest was 720 mm, and the average length was 554 mm (METF). A total of 12,810 of the chum salmon were successfully aged. Of these fish, age-0.3 (63.8%) was the most common followed by age-0.4 (29.3%), age-0.2 (6.3%) and age-0.5 (0.05%; Table 7). Age-0.1 and 0.6 were also present with one (1) each recorded. Estimates of age and size were for all fish sampled from the stratum and included additional fish that were not subsampled post season for MSA; detailed estimates of age and size composition by area and stratum are found in Appendix C.

Tissue Subsampling

Estimates of daily number of fish harvested, tissues collected, genotyped, and utilized for final analysis by area and stratum are found in Tables 5–6. The sampling specifics for each sample including harvest date(s), sample date, statistical areas, gear type, and port location are displayed in Appendices A1–4.

A total of 9,957 samples (1.2% of the total harvest) was selected and genotyped to represent the 2022 harvest for MSA, ranging from 209 to 432 among strata (Table 8).

LABORATORY ANALYSIS

Assaying Genotypes

We extracted and genotyped a total of 9,957 fish. We produced 955,872 total genotypes at 96 genetic markers. The overall genotyping success rate for all fish at the 96 SNP markers was 96.2%.

Laboratory Quality Control

The quality control process demonstrated a high concordance rate of 99.4% (Table 9). Assuming an equal error rate in the original and quality control genotyping process, and that this project accurately represents our genotyping process, South Alaska Peninsula chum harvest samples used in MSA were genotyped with an error rate of 0.28%.

STATISTICAL ANALYSIS

Data Retrieval and Quality Control

A total of 814 individuals were removed from further analysis based on the 80% rule, ranging from 8 to 56 among strata. Two individuals from one stratum were identified as alternate species and were removed. A total of 14 duplicate individuals were identified and removed, ranging from 0 to

3 among strata. After removing these 830 individuals, 9,127 samples remained and were used in the MSA (Table 8).

Stock Compositions Estimates by Fishery

June Fishery

The June fishery was sampled for chum salmon harvests in 2 area strata: the Southeastern and South Central Districts and the Unimak and Southwestern Districts. The Southeastern and South Central Districts area stratum included 4 temporal June strata for the seine fishery and 1 temporal June stratum for the gillnet fishery. The Unimak and Southwestern Districts area stratum included 4 temporal June strata for the seine fishery and 4 temporal June strata for the gillnet fishery. Sample goals were achieved in 12 of the 13 strata and sufficient samples were available for MSA in all 13 strata (Table 8).

Southeastern and South Central Districts

Seine

The seine harvests during the June fishery in the Southeastern and South Central Districts were represented by 4 temporal strata. The majority of the estimated harvest composition was from Asia, East of Kodiak, and CWAK reporting groups (Appendices B1-4; Figures 6). The Asia group was the largest contributor to harvest with a higher contribution during the first June stratum and decreased contributions later in June, ranging from 55.8% to 64.7%. The East of Kodiak group had a lower contribution during the early June strata and slightly increased contributions during later June strata, ranging from 15.9% to 21.4%. The CWAK group had a higher contribution during the early June strata and decreased contributions during later June strata, ranging from 10.0% to 17.1%. The only other group to exceed a 5% contribution in at least 1 stratum was the Kotzebue Sound group, ranging from 0% to 5.5%.

Harvests were lowest during the first June stratum and highest during the last June stratum, ranging from 16,419 to 75,336 fish. Estimated stock-specific harvests varied among strata for each reporting group with the Asia group dominating harvest in all strata (Appendices B1-4; Figure 6). In June stratum 1, the total harvest was 16,419 fish with 10,622 fish from the Asia group. There were 2,732 fish from the East of Kodiak group and 2,661 fish from the CWAK group. Harvests from other groups were relatively small. In June stratum 2, the total harvest was 41,246 fish with 22,996 fish from the Asia group, 7,056 fish from the CWAK group, and 6,577 fish from the East of Kodiak group. Harvests from other groups were relatively small. In June stratum 3, the total harvest was 34,281 fish with 20,446 fish from the Asia group, 7,327 fish from the East of Kodiak group, 3,426 fish from the CWAK group, and 1,900 fish from the Kotzebue Sound group. Harvests from other groups were relatively small. In June stratum 4, the total harvest was 75,336 fish with 42,629 fish from the Asia group, 14,333 fish from the East of Kodiak group, and 9,177 fish from the CWAK group. Harvests from other groups were relatively small.

When the 4 temporal strata were combined with the stratified estimator approach, total June seine harvest in the Southeastern and South Central Districts was 167,198 fish (Table 10; Figure 7). The Asia group comprised the majority of the harvest in June with an estimated 96,495 fish (57.7%). The East of Kodiak group contributed an estimated 30,956 fish (18.5%) and the CWAK group contributed an estimated 22,390 fish (13.4%). No other groups contributed more than 5% to the June seine harvest.

Gillnet

The gillnet harvests during the June fishery in the Southeastern and South Central Districts were represented by 1 temporal stratum. The East of Kodiak group was the largest contributor with 31.5% of the harvest, followed by Asia (23.2%), Chignik/Kodiak (16.8%), CWAK (14.3%), and South Peninsula (12.0%) groups (Appendix B5; Figure 8). No other groups contributed more than 5% of the harvest.

Gillnet harvests were lower than seine harvests in the Southeastern and South Central Districts. The total harvest was 10,729 fish with 3,385 fish from the East of Kodiak group and 2,489 fish from the Asia group (Appendix B5; Figure 8). There were also 1,808 fish from the Chignik/Kodiak group, 1,536 fish from the CWAK group, and 1,289 fish from the South Peninsula group. Harvests from other groups were relatively small.

All Southeastern and South Central June Harvests

The total June fishery harvest in the Southeastern and South Central Districts, including both gear types (seine and gillnet) and all strata, was 177,913 fish (Table 11; Figure 9). The Asia group comprised the majority of the harvest in June with an estimated 98,993 fish (55.6%). The East of Kodiak group contributed an estimated 34,377 fish (19.3%) and the CWAK group contributed an estimated 23,889 fish (13.4%). No other groups contributed more than 5% of the June harvest.

Unimak and Southwestern Districts

Seine

The seine harvests during the June fishery in the Unimak and Southwestern Districts were represented by 4 temporal strata. The majority of the estimated harvest composition was from Asia, CWAK, and East of Kodiak reporting groups (Appendices B6-9; Figure 10). The Asia group was the largest contributor to harvest with a lower contribution during the first June stratum and increased contributions later in June, ranging from 48.8% to 68.7%. The CWAK group had a higher contribution during the early June strata and decreased contributions during later June strata, ranging from 12.9% to 23.9%. The East of Kodiak group had a higher contribution during the first June stratum and decreased contributions later in June, ranging from 8.5% to 18.2%. The only other group to exceed a 5% contribution in at least 1 stratum was the Northern District group, ranging from 0% to 5.1%.

Harvests were lower during the first and fourth strata and higher during the second and third strata, ranging from 24,254 to 123,139 fish. Estimated stock-specific harvests varied among strata for each reporting group with the Asia group dominating harvest in all strata (Appendices B6-9; Figure 10). In June stratum 1, the total harvest was 24,254 fish with 11,829 fish from the Asia group, 5,786 fish from the CWAK group, and 4,423 fish from the East of Kodiak group. Harvests from other groups were relatively small. In June stratum 2, the total harvest was 123,139 fish with 71,878 fish from the Asia group, 26,890 fish from the CWAK group, and 11,321 fish from the East of Kodiak group. Harvests from other groups were relatively small. In June stratum 3, the total harvest was 120,443 fish with 82,705 fish from the Asia group, 16,002 fish from the CWAK group, and 10,245 fish from the East of Kodiak group. Harvests from other groups were relatively small. In June stratum 4, the total harvest was 54,039 fish with 33,021 fish from the Asia group, 6,982 fish from the East of Kodiak group, 6,961 fish from the CWAK group, and 2,755 fish from the Northern District group. Harvests from other groups were relatively small.

When the 4 temporal strata were combined with the stratified estimator approach, total June seine harvest in the Unimak and Southwestern Districts was 321,544 fish (Table 12; Figure 11). The Asia group comprised the majority of the harvest in June with an estimated 199,002 fish (61.9%). The CWAK group contributed an estimated 55,707 fish (17.3%) and the East of Kodiak group contributed an estimated 33,107 fish (10.3%). No other groups contributed more than 5% of the June seine harvest.

Gillnet

The gillnet harvests during the June fishery in the Unimak and Southwestern Districts were represented by 4 temporal strata. The majority of the estimated harvest composition was from Asia, CWAK, and East of Kodiak groups (Appendices B10-13; Figure 12). The Asia group had a similar harvest contribution across all June strata, ranging from 35.2% to 40.9%. The CWAK group had a similar contribution as Asia during the early June strata and a decreased contribution during the last June stratum, ranging from 26.4% to 40.6%. The East of Kodiak group had lower contributions during the early June strata and an increased contribution during the last June stratum, ranging from 10.7% to 19.6%. The only other group to exceed a 5% contribution in at least 1 stratum was the Northwestern District group, ranging from 0% to 5.8%.

Harvests increased from the first stratum through the third stratum and decreased during the fourth stratum, ranging from 1,487 to 16,302 fish. Estimated stock-specific harvests varied among strata for each reporting group with Asia and CWAK groups dominating harvest in all strata (Appendices B10-13; Figure 12). In June stratum 1, the total harvest was 10,797 fish with 4,351 fish from the Asia group, 3,757 fish from the CWAK group, and 1,235 fish from the East of Kodiak group. Harvests from other groups were relatively small. In June stratum 2, the total harvest was 15,665 fish with 6,363 fish from the CWAK group, 5,579 fish from the Asia group, and 1,839 fish from the East of Kodiak group. Harvests from other groups were relatively small. In June stratum 3, the total harvest was 16,302 fish with 6,668 fish from the Asia group, 6,045 fish from the CWAK group, and 1,742 fish from the East of Kodiak group. Harvests from other groups were relatively small. In June stratum 4, the total harvest was 1,487 fish with 523 fish from the Asia group, 392 fish from the CWAK group, and 291 fish from the East of Kodiak group. Harvests from other groups were relatively small.

When the 4 temporal strata were combined with the stratified estimator approach, total June gillnet harvest in the Unimak and Southwestern Districts was 44,334 fish (Table 13; Figure 13). The Asia and CWAK groups comprised the majority of the harvest in June. The Asia group contributed an estimated 17,150 fish (38.7%) and the CWAK group contributed an estimated 16,586 fish (37.5%). The East of Kodiak group contributed an estimated 5,140 fish (11.6%). No other groups contributed more than 5% of the June gillnet harvest.

All Unimak and Southwestern June Harvests

The total June fishery harvest in the Unimak and Southwestern Districts, including both gear types (seine and gillnet) and all strata, was 366,590 fish (Table 14; Figure 14). The Asia group comprised the majority of the harvest in June with an estimated 216,593 fish (59.1%). The CWAK group contributed an estimated 72,275 fish (19.7%) and the East of Kodiak group contributed an estimated 38,393 fish (10.5%). No other groups contributed more than 5% of the June harvest.

All June Harvests

The total June fishery harvest across all districts, gear types, and strata was considerably larger than July and August harvests, with a total June harvest of 544,064 fish (Table 15; Figure 15). The Asia group contributed the largest proportion of the harvest in June with an estimated 315,162 fish (58.0%). The CWAK group had the second largest contribution with an estimated 96,116 fish (17.7%) and the East of Kodiak group contributed an estimated 72,712 fish (13.4%). Harvests from other reporting groups were relatively small.

July Fishery

The July fishery was sampled for chum salmon harvest in 2 area strata including the Southeastern and South Central Districts and the Unimak and Southwestern Districts. The Southeastern and South Central Districts area stratum included 3 temporal July strata for the seine fishery and 3 temporal July strata for the gillnet fishery. The Unimak and Southwestern Districts area stratum included 2 temporal July strata for the seine fishery and 2 temporal July strata for the gillnet fishery. Sample goals were achieved in 6 of the 10 strata and sufficient samples were available for MSA in all 10 strata (Table 8).

Southeastern and South Central Districts

Seine

The seine harvests during the July fishery in the Southeastern and South Central Districts were represented by 3 temporal strata. The majority of the estimated harvest composition was from East of Kodiak, South Peninsula, Chignik/Kodiak, and Asia reporting groups (Appendices B14-16; Figure 16). The East of Kodiak group had a lower contribution during the first July stratum and increased contributions later in July, ranging from 30.2% to 48.2%. The South Peninsula group had lower contributions during the early July strata and an increased contribution during the last July stratum, ranging from 20.2% to 35.4%. The Chignik/Kodiak group had a higher contribution during the first July stratum and decreased contributions during later July strata, ranging from 14.5% to 20.3%. The Asia group had a higher contribution during the first July stratum and decreased contributions throughout July, ranging from 6.0% to 22.5%. No other groups contributed more than 5% of the harvest within a stratum.

Harvests increased from the first stratum through the third stratum, ranging from 32,704 to 56,716 fish. Estimated stock-specific harvests varied among strata for each reporting group with the East of Kodiak group contributing the most harvest in all strata (Appendices B14-16; Figure 16). In July stratum 1, the total harvest was 32,704 fish with 9,882 fish from the East of Kodiak group, 7,372 fish from the Asia group, 6,646 fish from the Chignik/Kodiak group, and 6,612 fish from the South Peninsula group. Harvests from other groups were relatively small. In July stratum 2, the total harvest was 36,682 fish with 17,683 fish from the East of Kodiak group, 7,758 fish from the South Peninsula group, 5,364 fish from the Asia group, and 5,333 fish from the Chignik/Kodiak group. Harvests from other groups were relatively small. In July stratum 3, the total harvest was 56,716 fish with 23,348 fish from the East of Kodiak group, 20,075 fish from the South Peninsula group, 8,392 fish from the Chignik/Kodiak group, and 3,392 fish from the Asia group. Harvests from other groups were relatively small.

When the 3 temporal strata were combined with the stratified estimator approach, total July seine harvest in the Southeastern and South Central Districts was 126,245 fish (Table 16; Figure 17). The East of Kodiak and South Peninsula groups comprised the majority of the harvest in July. The

East of Kodiak group contributed an estimated 50,977 fish (40.4%) and the South Peninsula group contributed an estimated 34,454 fish (27.3%). The Chignik/Kodiak group contributed an estimated 20,371 fish (16.2%) and the Asia group contributed an estimated 16,182 fish (12.8%). No other groups contributed more than 5% of the July seine harvest.

Gillnet

The gillnet harvests during the July fishery in the Southeastern and South Central Districts were represented by 3 temporal strata. The majority of the estimated harvest composition was from Chignik/Kodiak, South Peninsula, and East of Kodiak reporting groups (Appendices B17-19; Figure 18). The Chignik/Kodiak group had higher contributions during early July strata and a decreased contribution during the last July stratum, ranging from 37.2% to 49.5%. The South Peninsula group had a similar harvest contribution across all July strata, ranging from 30.9% to 34.9%. The East of Kodiak group had lower contributions during early July strata and an increased contribution during the last July stratum, ranging from 15.6% to 26.4%. No other groups contributed more than 5% of the harvest within a stratum.

Harvests slightly increased from the first stratum through the third stratum, ranging from 4,092 to 5,189 fish. Estimated stock-specific harvests varied among strata for each reporting group with the Chignik/Kodiak group contributing the most harvest in all strata (Appendices B17-19; Figure 18). In July stratum 1, the total harvest was 4,092 fish with 1,868 fish from the Chignik/Kodiak group, 1,429 fish from the South Peninsula group, and 638 fish from the East of Kodiak group. Harvests from other groups were relatively small. In July stratum 2, the total harvest was 4,833 fish with 2,393 fish from the Chignik/Kodiak group, 1,496 fish from the South Peninsula group, and 812 fish from the East of Kodiak group. Harvests from other groups were relatively small. In July stratum 3, the total harvest was 5,189 fish with 1,928 fish from the Chignik/Kodiak group, 1,807 fish from the South Peninsula group, and 1,369 fish from the East of Kodiak group. Harvests from other groups were relatively small.

When the 3 temporal strata were combined with the stratified estimator approach, total July gillnet harvest in the Southeastern and South Central Districts was 14,106 fish (Table 17; Figure 19). The Chignik/Kodiak and South Peninsula groups comprised the majority of the harvest in July. The Chignik/Kodiak group contributed an estimated 6,178 fish (44.0%) and the South Peninsula group contributed an estimated 4,719 fish (33.5%). The East of Kodiak group contributed an estimated 2,822 fish (20.0%). No other groups contributed more than 5% of the July gillnet harvest.

All Southeastern and South Central July Harvests

The total July fishery harvest in the Southeastern and South Central Districts, including both gear types (seine and gillnet) and all strata, was 140,191 fish (Table 18; Figure 20). The East of Kodiak group contributed the largest proportion of the harvest in July with an estimated 53,755 fish (38.4%). The South Peninsula group contributed an estimated 39,290 fish (28.1%), the Chignik/Kodiak group contributed an estimated 26,594 fish (19.0%), and the Asia group contributed an estimated 16,298 fish (11.6%). No other groups contributed more than 5% of the July harvest.

Unimak and Southwestern Districts

Seine

The seine harvests during the July fishery in the Unimak and Southwestern Districts were represented by 2 temporal strata. The estimated harvest composition was spread across many reporting groups with the majority of the contribution from Asia, South Peninsula, Chignik/Kodiak, East of Kodiak, and CWAK reporting groups (Appendices B20-21; Figure 21). The Asia group had a higher contribution during the first July stratum (37.4%) and a decreased contribution in the second July stratum (16.0%). The South Peninsula group had a minimal contribution during the first July stratum (1.6%) and an increased contribution during the second July stratum (29.1%). The Chignik/Kodiak group also had a minimal contribution during the first July stratum (6.9%) and an increased contribution during the second July stratum (23.1%). The East of Kodiak group had a higher contribution during the first July stratum (21.5%) and a decreased contribution during the second July stratum (16.0%). The CWAK group had a higher contribution during the first July stratum (14.5%) and a decreased contribution during second July stratum (7.5%). Additionally, Kotzebue Sound (5.5%), Northern District (5.7%), and Northwestern District (5.7%) contributed more than 5% during the first July stratum, and the Northwestern District (5.0%) contributed more than 5% during the second July stratum.

Harvests decreased from the first stratum to the second stratum, and estimated stock-specific harvests varied amongst strata (Appendices B20-21; Figure 21). In July stratum 1, the total harvest was 30,008 fish with 11,232 fish from the Asia group, 6,444 fish from the East of Kodiak group, 4,348 fish from the CWAK group, 2,060 fish from the Chignik/Kodiak group, 1,725 fish from the Northern District group, 1,708 fish from the Northwestern District group, and 1,651 fish from the Kotzebue Sound group. Harvests from other groups were relatively small. In July stratum 2, the total harvest was 12,708 fish with 3,703 fish from the South Peninsula group, 2,939 fish from the Chignik/Kodiak group, 2,036 fish from the Asia group, 2,031 fish from the East of Kodiak group, and 641 fish from the Northwestern District group. Harvests from other groups were relatively small.

When the 2 temporal strata were combined with the stratified estimator approach, total July seine harvest in the Unimak and Southwestern Districts was 42,634 fish (Table 19; Figure 22). The Asia group contributed the largest proportion of the harvest in July with an estimated 13,212 fish (31.1%). The East of Kodiak group contributed an estimated 8,458 fish (19.9%), the CWAK group contributed an estimated 5,266 fish (12.4%), the Chignik/Kodiak group contributed an estimated 4,994 fish (11.7%), the South Peninsula group contributed an estimated 4,266 fish (10.0%), and the Northwestern District contributed an estimated 2,360 fish (5.5%). No other groups contributed more than 5% of the July seine harvest.

Gillnet

The gillnet harvests during the July fishery in the Unimak and Southwestern Districts were represented by 2 temporal strata. The majority of the estimated harvest composition was from South Peninsula, Chignik/Kodiak, and East of Kodiak reporting groups (Appendices B22-23; Figure 23). The South Peninsula group had a lower contribution during the first July stratum (38.4%) and an increased contribution during the second July stratum (67.2%). The Chignik/Kodiak group had a higher contribution during the first July stratum (26.5%) and a decreased contribution during the second July stratum (13.8%). The East of Kodiak group also had a higher contribution during the first July stratum (20.0%) and a decreased contribution during the

second July stratum (6.6%). The only other group to exceed a 5% contribution in at least 1 stratum was the Northwestern District group during the second stratum (9.2%).

Harvests increased from the first stratum to the second stratum, and estimated stock-specific harvests varied amongst strata (Appendices B22-23; Figure 23). In July stratum 1, the total harvest was 2,027 fish with 778 fish from the South Peninsula group, 537 fish from the Chignik/Kodiak, and 405 fish from the East of Kodiak group. Harvests from other groups were relatively small. In July stratum 2, the total harvest was 3,812 fish with 2,561 fish from the South Peninsula group, 527 fish from the Chignik/Kodiak group, 350 fish from the Northwestern District group, and 252 fish from the East of Kodiak group. Harvests from other groups were relatively small.

When the 2 temporal strata were combined with the stratified estimator approach, total July gillnet harvest in the Unimak and Southwestern Districts was 5,844 fish (Table 20; Figure 24). The South Peninsula group comprised the majority of the harvest in July with an estimated 3,339 fish (57.3%), Chignik/Kodiak contributed an estimated 1,061 fish (18.2%), the East of Kodiak group contributed an estimated 661 fish (11.3%), and the Northwestern District contributed an estimated 439 fish (7.5%). No other groups contributed more than 5% of the July gillnet harvest.

All Unimak and Southwestern July Harvests

The total July fishery harvest in the Unimak and Southwestern Districts, including both gear types (seine and gillnet) and all strata, was 48,558 fish (Table 21; Figure 25). The Asia group contributed the largest proportion of the harvest in July with an estimated 13,410 fish (27.6%). The East of Kodiak group contributed an estimated 9,143 fish (18.9%), the South Peninsula group contributed an estimated 7,637 fish (15.7%), the Chignik/Kodiak group contributed an estimated 6,053 fish (12.5%), the CWAK group contributed an estimated 5,354 fish (11.1%), and the Northwestern District contributed an estimated 2,797 fish (5.8%). No other groups contributed more than 5% of the June harvest.

All July Harvests

The total July fishery harvest across all districts, gear types, and strata was smaller than June harvest and larger than the August harvest, with a total harvest of 188,770 fish (Table 22; Figure 26). The East of Kodiak group contributed the largest proportion of the harvest in July with an estimated 63,004 fish (33.4%). The South Peninsula group had the second largest contribution with an estimated 46,958 fish (24.9%), the Chignik/Kodiak group contributed an estimated 32,897 fish (17.4%), and the Asia group contributed an estimated 29,792 fish (15.8%). Harvests from other groups were relatively small.

August Fishery

The August seine fishery was sampled for chum salmon harvest in 2 area strata including the Southeastern and South Central Districts and the Unimak and Southwestern Districts. The Southeastern and South Central Districts area stratum included 2 temporal August strata for the seine fishery. The Unimak and Southwestern Districts area stratum included 2 temporal August strata for the seine fishery. The August gillnet fishery was sampled for chum salmon harvest in 1 area stratum, South Alaska Peninsula (Southeastern, South Central, Unimak, and Southwestern Districts pooled). The South Alaska Peninsula area stratum included 1 temporal August stratum. Sample goals were achieved in 2 of the 5 strata and sufficient samples were available for MSA in 5 strata (Table 8).

Southeastern and South Central Districts

Seine

The seine harvests during the August fishery in the Southeastern and South Central Districts were represented by 2 temporal strata. The majority of the estimated harvest composition was from Chignik/Kodiak and South Peninsula reporting groups (Appendices B24, 25; Figure 27). Chignik/Kodiak group had a higher contribution during the first August stratum (55.1%) and a decreased contribution during the second August stratum (41.2%). South Peninsula group had a lower contribution during the first August stratum (38.7%) and an increased contribution during the second August stratum (49.1%). The only other group to exceed a 5% contribution in at least 1 stratum was the East of Kodiak group during the second stratum (7.5%).

Harvests decreased from the first stratum to the second stratum, and estimated stock-specific harvests varied among strata for each reporting group with the Chignik/Kodiak and South Peninsula groups dominating the harvest in both strata (Appendices B24, 25; Figure 27). In August stratum 1, the total harvest was 35,706 fish with 19,677 fish from the Chignik/Kodiak group and 13,830 fish from the South Peninsula group. Harvests from other groups were relatively small. In August stratum 2, the total harvest was 9,793 fish with 4,813 fish from the South Peninsula group and 4,036 fish from the Chignik/Kodiak group. Harvests from other groups were relatively small.

When the 2 temporal strata were combined with the stratified estimator approach, the total August seine harvest in the Southeastern and South Central Districts was 45,566 fish (Table 23; Figure 28). The Chignik/Kodiak group comprised the largest proportion of the harvest in August with an estimated 23,701 fish (52.1%). The South Peninsula group also contributed to a large proportion of the harvest with an estimated 18,677 fish (41.1%). No other groups contributed more than 5% of the August seine harvest.

Unimak and Southwestern Districts

Seine

The seine harvests during the August fishery in the Unimak and Southwestern Districts were represented by 2 temporal strata. The majority of the estimated harvest composition was from South Peninsula reporting group (Appendices B26, 27; Figure 29). South Peninsula group had a higher contribution during the first August stratum (91.5%) and a slightly decreased contribution during the second August stratum (82.0%). The only other groups to exceed a 5% contribution in at least 1 stratum was the Northwestern District group during the second stratum (14.0%) and the Chignik/Kodiak group (7.1%) during the first stratum.

Harvests decreased from the first stratum to the second stratum, and estimated stock-specific harvests varied amongst strata (Appendices B26, 27; Figure 29). In August stratum 1, the total harvest was 18,807 fish with 17,206 fish from the South Peninsula group and 1,338 fish from the Chignik/Kodiak group. Harvests from other groups were relatively small. In August stratum 2, the total harvest was 10,017 fish with 8,210 fish from the South Peninsula group and 1,401 fish from the Northwestern District group. Harvests from other groups were relatively small.

When the 2 temporal strata were combined with the stratified estimator approach, the total August seine harvest in the Unimak and Southwestern Districts was 28,821 fish (Table 24; Figure 30). The South Peninsula group (88.0%) dominated the harvest in August with an estimated 25,252

fish. The only other group to contribute more than 5% of the harvest was Chignik/Kodiak (5.5%) with an estimated 1,591 fish.

South Alaska Peninsula Gillnet

The gillnet harvests during the August fishery in the South Alaska Peninsula area (Southeastern, South Central, Unimak, and Southwestern Districts) were represented by 1 temporal stratum. The South Peninsula reporting group was the largest contributor with 64.0% of the harvest, followed by Chignik/Kodiak (33.0%) and East of Kodiak (2.4%) groups (Appendix B28; Figure 31). No other groups contributed more than 1% of the harvest.

South Alaska Peninsula gillnet total harvest was 7,048 fish with 4,511 fish from the South Peninsula group and 2,325 fish from the Chignik/Kodiak group (Appendix B28; Figure 31). Harvests from other groups were relatively small.

All August Harvests

The total August fishery harvest across all districts, gear types, and strata was lower than June and July harvests with a total harvest of 81,418 fish. The majority of the estimated harvest composition was from South Peninsula and Chignik/Kodiak reporting groups (Table 25; Figure 32). The South Peninsula group contributed the largest proportion of the harvest in August with an estimated 48,335 fish (59.5%). The Chignik/Kodiak group had the second largest contribution with an estimated 27,862 fish (34.3%). Harvests from other groups were relatively small.

All Post-June Harvests

The total Post-June fishery harvest across all districts, gear types, and strata was 270,065 fish. The majority of the estimated harvest composition was from South Peninsula, East of Kodiak, Chignik/Kodiak, and Asia reporting groups (Table 26; Figure 33). The South Peninsula group comprised the largest proportion of the harvest with an estimated 95,124 fish (35.3%). The East of Kodiak group contributed an estimated 65,173 fish (24.2%), the Chignik/Kodiak group contributed an estimated 60,922 fish (22.6%), and the Asia group contributed an estimated 30,613 fish (11.3%). Harvests from other groups were relatively small.

All South Alaska Peninsula Harvests

The total South Alaska Peninsula fishery harvest across all months, districts, and gear types was 814,279 fish. The majority of the estimated harvest composition was from Asia, East of Kodiak, South Peninsula, CWAK, and Chignik/Kodiak reporting groups (Table 27; Figure 34). The Asia group comprised the largest proportion of the harvest with an estimated 345,896 fish (42.5%). The East of Kodiak group contributed an estimated 137,944 fish (16.9%), the South Peninsula group contributed an estimated 107,559 fish (13.2%), the CWAK group contributed an estimated 103,798 fish (12.8%), and the Chignik/Kodiak group contributed an estimated 72,050 fish (8.9%). Harvests from other groups were relatively small.

Summary of Asia and CWAK Harvests

Harvests of both Asia and CWAK were greatest in June and decreased throughout the season. Most of the total estimated harvest of both Asia (199,253 fish, 57.6% of total) and CWAK (55,933 fish, 53.8% of total; Table 28) was harvested in the Unimak and Southwestern Districts seine fishery, ranging from 3.4-23.9% among temporal strata for Asia and 5.6-26.0% among temporal strata for CWAK. The ratio of Asia to CWAK fish was greater than 1 for 27 of 28 strata (0.9 for Unimak and Southwestern Districts gillnet June 2 stratum), indicating that more Asia fish were

caught than CWAK fish in almost all areas, time periods, and gear types. Overall, 346,978 Asia fish are estimated to have been harvested in the South Alaska Peninsula fishery in 2022, compared to 103,978 CWAK fish, resulting in an Asia to CWAK ratio of 3.3.

Age Compositions Estimates and Length Distributions by Fishery

June Fishery

Southeastern and South Central Districts

Seine

The seine harvests during the June fishery in the Southeastern and South Central Districts were represented by 4 temporal strata. The estimated age composition of the harvest was primarily age-0.3 and -0.4 (Appendix C1-4). Age-0.3 fish ranged from 63% in the first June stratum to 70% in the fourth June stratum, whereas age-0.4 fish ranged from 33% in the first June stratum to 23% in the fourth June stratum. Age-0.2 fish were uncommon early but increased to 6% in the fourth June stratum. Mean size (mm) ranged from 549 in the fourth June stratum to 568 in the third June stratum. Overall in June, the percentage of age-0.3 was 66% and age-0.4 was 30% whereas the mean size was estimated to be 555 mm (Figure 35, 36, Appendix C5).

Gillnet

The gillnet harvests during the June fishery in the Southeastern and South Central Districts were represented by 1 temporal stratum. The estimated age composition of the harvest was primarily age-0.3 and -0.4. The percentage of age-0.3 fish was 54% whereas age-0.4 fish was 44%. Mean size (mm) was estimated at 558 (Figure 35, 36, Appendix C6).

Unimak and Southwestern Districts

Seine

The seine harvests during the June fishery in the Unimak and Southwestern Districts were represented by 4 temporal strata. The estimated age composition of the harvest was primarily age-0.3 and -0.4 (Figure 35-36, Appendix C7-10). The percentage of age-0.3 fish ranged from 63% in the first June stratum to 74% in the second June stratum, whereas age-0.4 fish ranged from 34% in the first June stratum to 21% in the third June stratum. Age-0.2 fish were uncommon early but increased to 14% in the fourth June stratum. Mean size (mm) decreased from 538 in the first June stratum to 525 in the fourth June stratum. Overall in June, the percentage of age-0.3 was 68%, age-0.4 was 24% and age-0.2 was 8% whereas the mean size was estimated to be 531 mm (Figure 35, 36, Appendix C11).

Gillnet

The gillnet harvests during the June fishery in the Unimak and Southwestern Districts were represented by 4 temporal strata. The estimated age composition of the harvest was primarily age-0.3 and -0.4 (Appendix C12–15). The percentage of age-0.3 fish ranged from 61% in the first June stratum to 69% in the fourth June stratum, whereas age-0.4 fish ranged from 37% in the first June stratum to 26% in the fourth June stratum. Age-0.2 fish were uncommon early but increased to 5% in the fourth June stratum. Mean size (mm) decreased from 541 in the first June stratum to 537 in the fourth June stratum. Overall in June, the percentage of age-0.3 was 66% and age-0.4 was 31% whereas the mean size was estimated to be 540 mm (Figure 35, 36, Appendix C16).

July Fishery

Southeastern and South Central and Districts

Seine

The seine harvests during the July fishery in the Southeastern and South Central Districts were represented by 3 temporal strata. The estimated age composition of the harvest was primarily age-0.3 and -0.4 (Appendix C17-19). The percentage of age-0.3 fish ranged from 66% in the third July stratum to 74% in the second July stratum, whereas age-0.4 fish ranged from 18% in the second July stratum to 28% in the first July stratum. Age-0.2 fish were uncommon early but increased to 9% in the third July stratum. Mean size (mm) ranged from 568 in the first July stratum to 571 in the third July stratum. Overall in July, the percentage of age-0.3 was 68%, age-0.4 was 25% and age-0.2 was 6% whereas the mean size was estimated to be 569 mm (Figure 35, 36, Appendix C20).

Gillnet

The gillnet harvests during the July fishery in the Southeastern and South Central Districts were represented by 3 temporal strata. The estimated age composition of the harvest was primarily age-0.3 and -0.4 (Appendix C21-23). The percentage of age-0.3 fish ranged from 60% in the first July stratum to 67% in the second July stratum, whereas age-0.4 fish ranged from 38% in the first July stratum to 29% in the second July stratum. Age-0.2 fish were uncommon early but increased to 5% in the third July stratum. Mean size (mm) ranged from 566 in the first July stratum to 565 in the third July stratum. Overall in July, the percentage of age-0.3 was 63% and age-0.4 was 34% whereas the mean size was estimated to be 566 mm (Figures 35, 36, Appendix C24).

Unimak and Southwestern Districts

Seine

The seine harvests during the July fishery in the Unimak and Southwestern Districts were represented by 2 temporal strata. The estimated age composition of the harvest was primarily age-0.3 and -0.4 (Appendix C25-26). The percentage of age-0.3 fish decreased from 73% in the first July stratum to 61% in the second July stratum, whereas age-0.4 fish increased from 23% in the first July stratum to 35% in the second July stratum. Age-0.2 fish were uncommon but estimated at 5% in the first July stratum. Mean size (mm) ranged from 573 in the first July stratum to 574 in the second July stratum. Overall in July, the percentage of age-0.3 was 65% and age-0.4 was 30% whereas the mean size was estimated to be 574 mm (Figure 35, 36, Appendix C27).

Gillnet

The gillnet harvests during the July fishery in the Unimak and Southwestern Districts were represented by 2 temporal strata. The estimated age composition of the harvest was primarily age-0.3 and -0.4 (Appendix C28, 29). The percentage of age-0.3 fish increased from 46% in the first July stratum to 57% in the second July stratum, whereas age-0.4 fish decreased from 49% in the first July stratum to 35% in the second July stratum. Age-0.2 fish increased from 5% in the first July stratum to 8% in the second July stratum. Mean size (mm) decreased from 569 in the first July stratum to 567 in the second July stratum. Overall in July, the percentage of age-0.3 was 53%, age-0.4 was 39% and age-0.2 was 7% whereas the mean size was estimated to be 568 mm (Figure 35-36, Appendix C30).

August Fishery

Southeastern and South Central and Districts

Seine

The seine harvests during the August fishery in the Southeastern and South Central Districts were represented by 2 temporal strata. The estimated age composition of the harvest was primarily age-0.3, -0.4, and -0.2 (Appendix C31-32). The percentage of age-0.3 fish decreased from 65% in the first August stratum to 57% in the second August stratum, whereas age-0.4 fish increased from 19% in the first August stratum to 22% in the second August stratum. Age-0.2 fish increased from 16% in the first August stratum to 21% in the second August stratum. Mean size (mm) ranged from 560 in the first August stratum to 559 in the second August stratum. Overall in August, the percentage of age-0.3 was 61%, age-0.4 was 20% and age-0.2 was 18%, whereas the mean size was estimated to be 559 mm (Figure 35, 36, Appendix C33).

Unimak and Southwestern Districts

Seine

The seine harvests during the August fishery in the Unimak and Southwestern Districts were represented by 2 temporal strata. The estimated age composition of the harvest was primarily age-0.3, -0.4, and -0.2 (Appendix C34-35). The percentage of age-0.3 fish decreased from 57% in the first August stratum to 47% in the second August stratum, whereas age-0.4 fish increased from 19% in the first August stratum to 37% in the second August stratum. Age-0.2 fish decreased from 23% in the first August stratum to 16% in the second August stratum. Mean size (mm) increased from 547 in the first August stratum to 554 in the second August stratum. Overall in August, the percentage of age-0.3 was 51%, age-0.4 was 29% and age-0.2 was 19% whereas the mean size was estimated to be 551 mm (Figure 35-36, Appendix C36).

South Alaska Peninsula Gillnet

The gillnet harvests during the August fishery in the South Alaska Peninsula area (Southeastern, South Central, Unimak, and Southwestern Districts) were represented by 1 temporal strata. The estimated age composition of the harvest was primarily age-0.3, -0.4, and -0.2 (Figure 35-36, Appendix C37). The percentage of age-0.3 fish was 59%, age-0.4 fish were 24%, and age-0.2 were 17%. Mean size (mm) was estimated at 562.

DISCUSSION

SUMMARY OF PROJECT ACCOMPLISHMENTS

Precise estimates of stock and age of harvests

We collected 14,869 samples of tissue for genetic analysis from chum salmon harvested in the major South Alaska Peninsula fisheries over the 2022 fishing season from June to August. Tissue samples were collected from approximately every day the fishery was open and deliveries occurred. From these samples, we selected 9,957 subsamples of genetic tissues in proportion to catch within 28 strata defined by designated areas, gear type and time periods. We genotyped these samples for 96 genetic markers common to the coastwide baseline and used genetic MSA techniques to estimate stock proportions and stock-specific harvests of chum salmon in the South Alaska Peninsula strata using reporting groups defined in WASSIP. The extensive sampling and

analysis of 2022 harvests resulted in genetic analysis of approximately 1 of every 82 fish harvested in 2022, a much higher analysis rate than the 1 of every 125 fish harvested in the WASSIP years (Eggers et al. 2011). This analysis rate is higher than most MSA programs conducted by the GCL, resulting in very precise estimates of stock-specific harvests. We also measured the length and determined ages from 14,869 catch samples, providing the first estimates of age composition of South Alaska Peninsula harvests and valuable context for future interpretation of stock composition estimates.

Deviations from original plan

Small harvests limited our ability to achieve sampling goals for all strata. We were able to follow the analysis plan laid out in this project's operational plan (Foster and Dann 2022) for June, but limited catches in July and August, in particular from the Unimak and Southwestern Districts, hampered our ability to sample catches from every day that harvest occurred in those months. As a result, we had fewer strata in those months than originally proposed. We proposed to analyze 3 temporal strata for each area/gear combination in July, but only analyzed 2 temporal strata for each gear type in the Southwest/Unimak Districts area. Similarly, we proposed to analyze gillnet harvests in the 2 areas in August separately but gillnet harvests were small in August and we analyzed a single temporal stratum representing harvests in both areas. However, since a majority of harvests were represented in MSA, stratified estimates that correspond to WASSIP estimates (June and post-June fisheries) are well represented by catch samples and are comparable to WASSIP estimates.

INTERPRETING RESULTS

Interpreting the results from this report requires knowledge about the precision and accuracy of estimates provided. For stock composition estimates, precision is affected by 3 main sources of uncertainty: 1) the size and representative nature of the catch sample, 2) the representativeness of the genetic baseline, and 3) the ability of the statistical method to estimate stock composition accurately and precisely, which is dependent on the underlying genetic distinctiveness of each stock (Koljonen et al. 2005).

Size and representativeness of the catch samples

We set a minimum sample size of 100 and a target sample size of 380 fish to represent temporal-area-gear strata. Under a worst-case scenario of 2 to 3 stocks contributing equally to the harvest, this level of sampling should provide estimates that are within 8% ($n=100$) and 5% ($n=380$) of the true proportion 90% of the time of the time, assuming no genetic error (Thompson 1987). Most of the time, stock compositions are different from these worst-case conditions and greater precision is possible given target sample sizes.

To increase the representativeness of the catch sample, samples were generally taken over time within a temporal stratum (typically daily). This sampling design was used to provide better representation of potential changes in stock composition through time within strata. In total, we sampled approximately 2% of total harvests in distributions representative of harvest magnitudes among areas, gear types, and time periods (Tables 5, 6). We analyzed approximately 1 of every 82 harvested fish (Table 8), resulting in very precise estimates of stock-specific harvests relative to MSA programs implemented elsewhere. Specific catch sampling details, including stratum affiliation, dates sampled, date-specific sample sizes, and associated stat areas and port location can be found in Appendices A1–4.

Representation of contributing populations

The WASSIP baseline was used and includes populations of chum salmon sampled around the Pacific Rim from Korea to the State of Washington (Figure 5). The final baseline included 32,817 individuals from 402 collections representing 310 populations. Individuals were assayed for 96 SNP markers that represented 91 loci. Average sample size representing each population was 106 individuals. This baseline contains more than 196 additional populations and almost twice the number of markers as the previously published baseline (Seeb et al. 2011b). Testing of the baseline demonstrated that the baseline performed well for the defined reporting groups (Habicht et al 2012b–c). Complete description of the baseline can be found in DeCovich et al. (2012b).

UPDATE TO WASSIP

The GCL normally waits to provide estimates of stock-specific harvests from a new fishery until 3 years of data are available so that data from an unusual year does not influence policy. We report the 2022 estimates of stock-specific harvests from South Alaska Peninsula fisheries here because estimates from WASSIP provide context for current estimates, and to inform the Alaska Peninsula Board of Fisheries meeting in February 2023. It should be noted that although WASSIP does provide context, the design of analysis of the 2022 harvests differed from WASSIP in some ways and additional estimates from 2023 to 2026 will provide valuable context for the 2022 estimates.

SIMILARITIES TO AND DIFFERENCES FROM WASSIP

This study shared many similarities to WASSIP but also differed in some important respects that merit consideration. Aspects of this study’s methods to consider when comparing estimates to WASSIP estimates are the design and rate of fishery sampling and genetic analysis, additional analyses that were not available from WASSIP, and how the fishery was prosecuted relative to the WASSIP years (2007-2009).

Same Genetic Baseline and Model

Perhaps the aspect that makes 2022 estimates most comparable with WASSIP is that the same genetic baseline was used to generate stock composition estimates in this project (DeCovich et al. 2012b). Although the program used to estimate stock compositions in 2022 (*rubias*) is different from the program used in WASSIP (*BAYES*, Pella and Masuda 2001), it is based on the same underlying model but with more efficient programming (Moran and Anderson 2019). Similarly, the stratified estimator approach of weighting estimates by their respective harvests is the same method used in WASSIP, despite the addition of gear types in the hierarchy of stratification.

Temporal and Spatial Design of Sampling and Analysis

The temporal and spatial extent of harvest sampling and analysis has many similarities to and some differences from WASSIP. Temporally, sampling occurred over a similar time frame and resolution, but this project extended further into August to encompass the entire season. Spatially, the areas sampled are similar but in 2022, the WASSIP sampled areas of Unimak and Ikatan were combined to better represent the fleet dynamics and characteristics of the modern fishery. In a similar fashion, the Shumagin Islands and SEDM areas were combined. Due to changes in the way Dolgoi Island is now managed and the fact that sampling is now gear specific, the Dolgoi Island area sampled in WASSIP, which overlaps both the Southwestern and South Central Districts, was divided and the parts were recombined into their respective districts. The result was 2 major sampling areas: the Unimak and Southwestern Districts and the Southeastern and South Central

Districts resulting in essentially “West” and “East” South Alaska Peninsula areas. Though the number of sampling areas decreased compared to WASSIP, the sampling and analysis rate for this project was greater than WASSIP where on average among 2007–2009, 1 of every 125 harvested fish were analyzed (Templin et al. 2012, Munro et al. 2012), whereas 1 of every 82 fish harvested in 2022 was analyzed (Table 8).

Separation of Sampling and Analysis by Gear Type

A key difference from WASSIP was the separation of sampling and analysis by gear type (seine, drift gillnet, and set gillnet). This change allowed greater resolution with respect to gear selectivity and provides insight into the nature of spatial and fleet differences among the gear types. An added benefit of this separation was greater efficiency tracking samples, which was more challenging than in the past as the presence of COVID-19 has radically altered protocols within the processing industry for collecting samples from vessels, tenders, and at land-based processing facilities. Similarly, harvest differed greatly between seine and gillnet gear types, allowing for more accurate and precise estimates of overall harvest when weighting gear-specific estimates by their respective harvests.

Addition of Age and Length Compositions

A major addition to this study beyond what WASSIP provided was the pairing of age and length measurements with genetic tissue collection. Summaries of age and length composition among strata provide valuable context when interpreting stock composition estimates. Particularly with respect to differences in size selectivity between seine and gillnet gear types, estimates of age composition provide valuable context to interpreting stock composition estimates (see below), and will provide the opportunity to combine the 2 data types in analyses to estimate stock-specific cohort abundances in the future.

Fishery Management in 2022

Management of the commercial salmon fishery in the South Alaska Peninsula has changed slightly since WASSIP chum salmon sampling years 2007-2009. The general framework for the South Alaska Peninsula salmon management was established by the Alaska Board of Fisheries in 2004, when many chum salmon cap and sockeye-to-chum salmon ratio regulations were removed. In February 2004, the board modified the *South Unimak and Shumagin Islands June Fisheries Management Plan* (5 AAC 09.365) by establishing a fishing schedule that began at 6:00 a.m. on June 7 and ended at 10:00 p.m. on June 29. Fishing periods were, by regulation, 88 hours in duration interspersed by 32-hour closures, except for the final fishing period, which was 64 hours. Fishing time was concurrent for all gear types. The South Unimak fishery was expanded to include the entire Southwestern District and the West and East Pavlof Bay sections of the South Central District. In February 2007, the board made further modifications to the June fishery management plan. The description of the Sanak Island Section (Figure 1) was changed and the area allowed for drift gillnet gear was expanded into the outer portions of the Southwestern District. These regulations were in effect throughout the WASSIP sampling years.

In 2013, the board discussed proposed changes to the regulations for the June management plan. The board modified the June schedule for seine and drift gillnet gear by delaying the start date to June 10, which reduced fishing time by 64 hours. The June fishing schedule for set gillnet gear remained unchanged. During the February 2016 Alaska Peninsula, Aleutian Islands, and Chignik meeting, the board made changes to the *South Unimak and Shumagin Islands June Salmon*

Management Plan (5AAC 09.365) and the *Post-June Salmon Management Plan for the South Alaska Peninsula* (5AAC 09.366) by adopting regulations to limit the number of sockeye salmon harvested in the “Dolgoi Island area” as described in WASSIP. From June 1 through July 25, a harvest limit of 191,000 sockeye salmon, based on fish ticket information, was created. In 2019, the board removed purse seine gear from the “Dolgoi Island area” in June and the harvest in that area was substantially reduced. The board also amended 5 AAC 09.331 gillnet specifications and operations in 2019, which removed minimum mesh size regulations for set gillnets. Commercial salmon fishing regulations for the post-June and Southeastern District Mainland fisheries remained relatively unchanged between the WASSIP years and 2022, other than the “Dolgoi Island area” regulations mentioned above, which remain in effect through July 25.

The first commercial fishing period in 2022 began on June 6 at 6:00 a.m. for set gillnet gear only and closed at 10:00 p.m. on June 8. Test fishing for chum salmon presence in at Cape Lutke and Cape Lazaref (Figure 1) in the Unimak District and the east side of Popof Island (Figure 1) in the Shumagin Islands Section of the Southeastern District occurred on June 8, 9, and 10. These test fisheries precluded the normal start of seine fishing on June 10. Starting on June 11, commercial purse seiners coordinated fishing time between the seine fleet and their processors, within the allowed commercial openings, to reduce effort if chum salmon harvest was too high. Beginning at 6:00 a.m. on June 10, commercial salmon fishing was allowed for all gear types for 88-hours, although participation by the seine fleet was less than by set or drift gillnetters, as previously mentioned. The June 10 fishing period ended at 10:00 p.m. on June 13. This fishing period was followed by a closure of 32 hours for all gear types.

At the March 2022 Board of Fisheries meeting, the early run of sockeye salmon at the Chignik River was designated a Stock of Management Concern, and an interim action plan was created as Record Copy 104 (Mitchell 2022). This document was signed by the Area M Seiners Association and the Chignik Intertribal Coalition. The document outlined in-season management action that could be taken by the Department if the Chignik River early-run sockeye salmon escapement was not projected to be met, which included reducing the commercial salmon fishing periods in the Shumagin Islands Section of the Southeastern District by 50 percent for purse seine gear. In 2022, the Chignik River early-run escapement objectives were not projected to be met, and so on June 15, June 20, and June 25, commercial salmon fishing opened for purse seine gear in the Shumagin Islands Section of the Southeastern District for 40 hours per opening. Although these actions were directed at the reduction of harvest of sockeye salmon returning to the Chignik River, these reductions also reduced the harvest of chum salmon in the Shumagin Islands Section of the Southeastern District in June. The reductions also shifted some of the purse seine harvest effort into the Unimak and Southeastern Districts and potentially increased harvest in those areas.

In 2022, commercial salmon fishing for set gillnet gear opened in the Shumagin Islands Section of the Southeastern District on June 15, June 20, and June 25 for 88-hour fishing periods separated by closures of 32 hours. Also, commercial salmon fishing for set gillnet, drift gillnet, and seine gear opened in the South Unimak portions of the June fishery on June 15, June 20, and June 25 for 88-hour fishing periods separated by closures of 32 hours, although the purse seine fleet continued to monitor chum salmon harvest and reduced their fishing time if chum salmon harvest was too high. The final commercial fishing period in June ended at 10:00 p.m. on June 28. A total of 235 permit holders harvested 3,204 Chinook, 3,905,017 sockeye, 169 coho, 1,201,771 pink, and 544,097 chum salmon during the 2022 June fisheries.

During the post-June fisheries in 2022, harvest declined significantly. This is partially due to the departure of the drift gillnet fleet in July, which is typical of the Alaska Peninsula fishery. Some of the purse seine fleet also stopped fishing in the South Alaska Peninsula fishery and instead were contracted as tenders for the Bristol Bay sockeye salmon fishery. There were no reductions in fishing time or area in July in 2022 and any changes in fishing behavior were made independently of management actions. In late July, low water levels started to become an issue for pink and chum salmon escapement on the South Alaska Peninsula. After the final commercial salmon fishing period closed on July 31 at 6:00 p.m., the fishery remained closed due to low water and lack of escapement. Low water levels and poor survey conditions in early August prevented commercial openers. After conditions improved, and escapement was adequate, the commercial salmon fishery opened on August 15 in the Unimak District, Southwestern District, South Central District and Shumagin Islands Section of the Southeastern District. Pink salmon escapement remained strong, and commercial fishing remained open in these sections for the remainder of August. Certain areas, including the inside waters of Belkofski Bay and the Volcano Bay sections (Figure 2), remained closed later in August until chum salmon escapement had been achieved. The SEDM opened on August 15 once escapement of pink and chum salmon had been achieved. A total of 3 commercial fishing periods occurred after August 15 in the SEDM, with the required 36-hour closures between openings; this allowed maximum fishing time through the end of August.

COMPARISON TO WASSIP RESULTS

Given the differences in sampling and analysis design described above, not all estimates of 2022 harvest are directly comparable to WASSIP but some summary level estimates of stock-specific harvests are. WASSIP provided stratified estimates of stock-specific harvest at the fine-scale fishery level (e.g., June Shumagin Islands Section, all temporal strata), broad-scale fishery level (e.g., June fishery, all area and temporal strata), and across all WASSIP fisheries. Estimates that are comparable between 2022 and WASSIP are the June and post-June fisheries (Table 15, Table 26; Tables 122-127 of Munro et al. 2012). Similarities between these 2 timeframes are that 1) the June fishery is primarily one of non-local chum salmon populations of Asia, CWAK, and East of Kodiak transiting the fishery areas, and 2) post-June fishery shifts to harvests of local South Peninsula, Chignik/Kodiak and East of Kodiak. During the WASSIP study very little sampling occurred during the August fishery; however, 2022 data demonstrates a shift to primarily local stocks of South Peninsula and Chignik/Kodiak in August.

Averaging across the 3 WASSIP years, relative presence of Asia and East of Kodiak in 2022 June harvests were greater than in 2007–2009 in June with a relative decrease in CWAK abundance. In the post-June fisheries local stocks were a larger proportion of the harvest in 2022 compared to 2007–2009. Contributions to the June fishery increased from WASSIP years to 2022 for Asia (25% to 58%) and East of Kodiak (8% to 13%), whereas CWAK decreased (57% to 18%; Table 29, Figure 37). Contributions to the post-June fishery increased from Chignik/Kodiak (11% to 23%) and East of Kodiak (4% to 24%) in 2022 relative to the 2007–2009, whereas South Peninsula decreased (70% to 35%). No other stocks exhibited differences greater than 5% between the WASSIP years and 2022 in either fishery.

HARVESTS OF ASIA AND CWAK

Distribution of Total Harvest of Asia and CWAK among South Alaska Peninsula Fishery Components

Contributions from the Asia and CWAK groups peaked in June, decreased throughout July, and were minimal by August, present in the fishery at less than 1% of each stock's total harvest. For both Asia and CWAK, the vast majority of stock-specific total harvest occurred in the June fishery (91% for Asia, 93% for CWAK; Table 28). More of the June harvest took place in the Unimak and Southwestern Districts for both Asia (63% of total) and CWAK (70% of total) than in the Southeastern and South Central Districts (Asia = 29% of total, CWAK = 23% of total). Across both areas and all months, most of the total harvest of Asia (94%) and CWAK (82%) was caught by the seine fleet. However, it should be noted that the stock composition estimates for CWAK were greater in gillnet strata than seine strata (e.g., Tables 12-13), but higher harvests in seine strata resulted in the seine fleet harvesting a majority of CWAK total harvest.

Relative Presence of Asia and CWAK in South Alaska Peninsula Harvests

The relative presence of Asia and CWAK stocks in South Alaska Peninsula harvests was markedly different in 2022 than observed in the WASSIP years. Overall in 2022, 3.3 Asia chum salmon were harvested for every CWAK chum salmon whereas the average ratio of Asia to CWAK among 2007–2009 was 0.56 (Table 28).

Commercial chum salmon harvest in Asia is primarily prosecuted in Japan and Russia. During the WASSIP time frame for chum salmon estimates (2007–2009), chum salmon harvest in Japan averaged approximately 56.0 million fish while in Russia, during the same time frame, harvest averaged approximately 22.6 million fish. In 2021 and 2022, preliminary chum salmon harvest estimates in Japan were listed at around 17.1 and roughly 25.0 million fish whereas estimates from Russia were 23.9 million and roughly 10.5 million fish, respectfully (NPAFC 2022).

Since the Asia reporting group often represents the majority of the harvest in June, a large change in relative abundance of these western North Pacific stocks could alter stock compositions estimates in the South Alaska Peninsula commercial fishery. However, a number of additional factors could explain the difference in relative abundances observed in 2022 compared to 2007–2009. Some reasons could include changes in ocean climate, rearing conditions in the Bering Sea for specific populations, changes in the prosecution of the fishery, migration pathways within the central North Pacific Ocean, early marine survival, hatchery production in Japan, and in-river mortality of returning adults among other potential causes. Understanding the causes of changing relative abundances observed in the South Alaska Peninsula fishery is beyond the scope of this study.

Comments on Age Composition, Length, and Maturity

Comparing mean sizes of chum salmon sampled in the South Alaska Peninsula fisheries, there were increases between the June and July time frame for each fishery/gear combination followed by subsequent decreases in mean size and size distributions in August (Figure 35; Appendix C5, C16, C20, C24, C27, C30, C33, C36, C37). Examination of 95% confidence intervals suggests these differences are of statistical significance, though biological significance is unknown.

Trends in age compositions between the June and July fisheries (by gear) are less evident than for mean lengths (Figure 36; Appendix C). However, a categorical increase in estimated percent of

age-0.2 was observed in the August samples compared to both June and July fisheries. The August age composition estimates should be indicative of the age composition of the local stock escapement, assuming most are migrating mature fish preparing to spawn as evidenced by the stock composition estimates. In comparison to historical age composition estimates on the South Alaska Peninsula in late July and August from the commercial fishery in 1998, (Nelson et al. 1999), 2022 showed decreases in age-0.3 percent (73% in 1998) and increases in age-0.2 (5% in 1998), corroborating observations in 2022.

Maturity status of chum salmon sampled in this project is unknown. In 2000, a study on immature sockeye and chum salmon present in the Shumagin Islands immature test fishery in early July did determine maturity based on size, gonad weight and a gonadosomatic index (Foster et al. 2000). The chum salmon inspected were largely immature, but the mean length (423 mm) and distribution of sizes is only relevant to the smaller chum salmon examined during this project (Figure 35).

The observations on the age and size composition of different fisheries herein are important and will become increasingly useful as additional years of observation become available. However, these results should be interpreted with the context that there are significant differences in other aspects of the comparison; i.e., that different gears, even fishing in the same sampling areas showed large differences in stock composition and frequently fish in very different geographic areas. Therefore, speculation about the nature of differences in age and length composition is limited given the short time frame of publication.

FUTURE WORK

We plan to continue estimating the stock composition, stock-specific harvests, and length and age composition of chum salmon harvested in South Alaska Peninsula commercial fisheries in 2023-2026. We expect to follow a similar sampling and analysis plan to provide context from contemporary years that more likely reflect ocean conditions, relative productivity among stocks, and migratory pathways of chum salmon observed in 2022 than do the WASSIP years. These additional years of data will allow for a more direct and intentional analysis of stock and age compositions to better understand relationships between the 2 measurements and how they vary among months, gear types, and areas of the South Alaska Peninsula fishery. Explicit modeling that incorporates both age and genetic marks to estimate stock-specific cohorts are being developed in other regions of Alaska and may provide useful information for South Alaska Peninsula, notably in regard to pairing estimates of stock-specific cohort abundances in state managed fisheries with similar estimates from high seas surveys and bycatch observed in federally managed fisheries. Lastly, an updated coastwide genetic baseline for chum salmon is in development and may allow for more accurate and precise estimates of stock-specific harvests in future years.

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TABLES AND FIGURES

Table 1.—South Unimak and Shumagin Islands June commercial salmon harvest by species and year, 1979–2022.

Year	Permits	Landings	Number of salmon ^a					Total
			Chinook	Sockeye	Coho	Pink	Chum	
1979	196	1,695	1,050	851,351	290	154,813	104,103	1,111,607
1980	225	2,044	3,193	3,206,275	853	1,526,306	508,865	5,245,492
1981	243	2,400	5,672	1,820,965	320	451,250	563,947	2,842,154
1982	251	2,612	7,131	2,118,701	1,241	1,718,825	1,095,044	4,940,942
1983	281	1,721	13,456	1,961,569	4	55,875	785,631	2,816,535
1984	280	1,117	3,854	1,388,203	14	919,876	337,120	2,649,067
1985	305	2,120	5,777	1,791,400	2,468	106,615	433,829	2,340,089
1986	298	1,486	1,895	471,397	2	291,989	351,769	1,117,052
1987	290	2,019	5,163	792,964	380	16,982	443,019	1,258,508
1988	301	1,777	4,064	756,687	255	180,224	526,711	1,467,941
1989	305	1,350	2,758	1,744,505	0	199,235	455,163	2,401,661
1990	320	2,718	10,332	1,344,529	1	515,047	518,545	2,388,454
1991	334	2,025	4,473	1,548,930	12	619,137	772,705	2,945,257
1992	321	1,925	3,760	2,457,856	4	642,090	426,203	3,529,913
1993	327	2,262	9,466	2,973,744	1,233	81,136	532,247	3,597,826
1994	324	2,751	7,590	1,461,263	1,579	2,492,514	582,165	4,545,111
1995	332	3,635	14,747	2,105,321	6,042	178,635	537,433	2,842,178
1996	313	2,676	2,845	1,028,970	13,219	377,684	359,820	1,782,538
1997	292	3,174	5,811	1,628,181	560	605,937	322,325	2,562,814
1998	283	3,657	2,696	1,288,725	476	474,340	245,619	2,011,856
1999	277	2,114	3,051	1,375,399	2	30,539	245,306	1,654,297
2000	278	3,001	2,849	1,251,228	304	360,029	239,357	1,853,767
2001	128	270	345	150,632	2	39,251	48,350	238,580
2002	181	1,301	2,443	591,106	4	76,251	378,817	1,048,621
2003	177	1,170	1,323	453,147	153	217,900	282,438	954,961
2004	190	2,260	4,423	1,348,460	621	359,916	482,310	2,195,730
2005	190	2,344	3,055	1,004,395	1,919	1,654,959	427,830	3,092,158
2006	188	2,412	4,497	932,291	2,629	1,332,319	299,827	2,571,563
2007	185	2,650	4,636	1,589,840	1,633	267,528	297,539	2,161,176
2008	196	2,591	2,957	1,713,575	178	1,971,268	410,932	4,098,910
2009	216	2,852	3,836	1,167,918	203	2,248,555	696,775	4,117,287
2010	224	2,162	3,118	818,865	27	332,435	271,700	1,426,145
2011	211	2,279	3,464	1,359,441	124	723,135	423,335	2,509,499
2012	227	3,111	6,397	1,542,043	12	261,786	395,060	2,205,298
2013	219	2,567	2,237	1,562,849	299	304,022	399,058	2,268,465
2014	228	2,588	2,290	659,213	2,478	180,260	390,139	1,234,380
2015	227	2,636	44,389	1,115,504	20,193	573,104	178,715	1,931,905
2016	223	2,493	6,113	1,292,860	1,716	2,510,048	270,614	4,081,351

-continued-

Table 1.–Page 2 of 2.

Year	Permits	Landings	Number of salmon ^a					
			Chinook	Sockeye	Coho	Pink	Chum	Total
2017	226	2,326	4,955	1,956,065	43	1,714,307	640,891	4,316,261
2018	236	1,890	4,158	822,173	51	345,255	537,466	1,709,103
2019	236	1,996	10,049	630,888	3,681	9,021,357	549,072	10,215,047
2020	225	1,555	2,594	339,293	262	1,754,284	490,128	2,586,561
2021	229	1,898	3,188	3,541,620	86	4,038,219	1,168,601	8,751,714
2022	235	2,403	3,204	3,905,017	169	1,201,771	544,097	5,654,258
2003–2022 Average	214	2,309	6,044	1,387,773	1,824	1,550,621	457,826	3,404,089
2013–2022 Average	228	2,235	8,318	1,582,548	2,898	2,164,263	516,878	4,274,905

^a Does not include test fishery harvests or personal use.

Table 2.—Summary of stock-specific harvests of chum salmon in the June fishery of the South Alaska Peninsula in 2007–2009. Mean harvests summarize stock-specific harvests after temporal and area strata were summarized together into fishery strata (June fishery). Estimates include annual mean harvests, annual proportion of total harvest, and average of annual proportions.

Reporting group	June fishery mean harvests			June fishery mean proportion			June average
	2007	2008	2009	2007	2008	2009	
Asia	60,760	117,171	178,693	0.2	0.29	0.26	0.25
Kotzebue Sound	1,349	4,154	2,791	0.00	0.01	0.00	0.01
Coastal W. AK	177,867	214,464	420,739	0.60	0.52	0.60	0.57
Upper Yukon River	3,752	6,914	1,612	0.01	0.02	0.00	0.01
Northern District	861	5,533	5,816	0.00	0.01	0.01	0.01
Northwestern District	2,492	13,760	31,034	0.01	0.03	0.04	0.03
South Peninsula	3,401	8,108	8,113	0.01	0.02	0.01	0.01
Chignik/Kodiak	4,889	13,186	16,075	0.02	0.03	0.02	0.02
East of Kodiak	42,183	27,620	31,931	0.14	0.07	0.05	0.08
Total	297,554	410,910	696,804	1	1	1	1

Note: Estimates of June fishery mean harvests are sourced from Tables 122–124 from Munro et al. (2012), harvest and harvest rates by fishery, where area strata are rolled into fishery strata.

Table 3.—Summary of recent 10-year harvest averages for the June and post-June (July and August) fisheries for the South Alaska Peninsula, divided into Unimak and Southwestern Districts and Southeastern and South Central Districts, experimental design to be used to estimate the stock composition of South Peninsula chum salmon harvests, 2022–2026.

	Harvest (10-yr avg) ^a						
Fishery (Districts)	June		July		August		Total
	Seine	Gillnet	Seine	Gillnet	Seine	Gillnet	
Unimak and Southwestern	171,705	65,841	173,381	20,489	51,547	19,975	502,938
Southeastern and South Central	251,280	13,079	166,791	35,000	92,597	18,447	577,194

Fishery (Districts)	Design (# Temporal strata x sample size)						Total
	June		July		August		
	Seine	Gillnet	Seine	Gillnet	Seine	Gillnet	
Unimak and Southwestern	4 x 380	4 x 380 ^b	3 x 380	3 x 380 ^b	2 x 380	1 x 380 ^b	6,460
Southeastern and South Central	4 x 380	1 x 380 ^c	3 x 380	3 x 380 ^c	2 x 380	1 x 380 ^c	5,320

^a Average harvest over 10 years (2012 to 2021) if the area received effort and harvest by the gear type during that time frame.

^b Harvest in Unimak and Southwestern Districts is from drift gillnet gear type.

^c Harvest in Southeastern and South Central Districts is from set gillnet gear type.

Table 4.—Hierarchical design of stratified estimates of stock-specific harvests (and % of total harvest) from South Alaska Peninsula to individual spatiotemporal strata including the Unimak and Southwestern Districts (Unimak/SW) and Southeastern and South Central Districts (SE/SC).

Overall	June/post-June	Post-June months	Areas	Area/gear	Spatiotemporal strata	Harvest	
South Alaska Peninsula (100%)	June (67%)		Unimak/SW (45%)	Unimak/SW Seine (40%)	June Seine 1	24,254	
					June Seine 2	123,139	
					June Seine 3	120,443	
					June Seine 4	54,039	
				Unimak/SW Gillnet (5%)	June Gillnet 1	10,797	
					June Gillnet 2	15,665	
					June Gillnet 3	16,302	
					June Gillnet 4	1,487	
			SE/SC (22%)	SE/SC Seine (21%)	June Seine 1	16,419	
					June Seine 2	41,246	
					June Seine 3	34,281	
					June Seine 4	75,336	
	SE/SC Gillnet (1%)	June Gillnet	10,729				
	Post-June (33%)	July (23%)	Unimak/SW (6%)	Unimak/SW Seine (5%)	July Seine 1	30,008	
				Unimak/SW Gillnet (1%)	July Seine 2	12,708	
			SE/SC (17%)	SE/SC Seine (15%)	July Gillnet 1	2,027	
					July Gillnet 2	3,812	
				SE/SC Gillnet (2%)	July Seine 1	32,704	
					July Seine 2	36,682	
			August (10%)	Unimak/SW (4%)	Unimak/SW Seine (4%)	July Seine 3	56,716
						July Gillnet 1	4,092
		SE/SC (6%)		SE/SC Seine (6%)	July Gillnet 2	4,833	
July Gillnet 3					5,189		
South Pen (1%)	Gillnet (1%)	August Seine 1	18,807				
		August Seine 2	10,017				
August Seine 1	35,706						
August Seine 2	9,793						
August	7,048						

Table 5.—Unimak and Southwestern Districts, South Alaska Peninsula area, 2022. Commercial harvest, number of samples collected, and number of samples selected for genetic analysis, provided by date and grouped by gear type and temporal stratum.

Date	Seine				Gillnet			
	Temporal stratum	Harvest	Collected	Selected	Temporal stratum	Harvest	Collected	Selected
6/8		614						
6/9		178						
6/10		840			June 1	3,011	240	106
6/11	June 1	8,186	262	142	June 1	4,001	240	141
6/12	June 1	10,824	160	160	June 1	2,819	160	99
6/13	June 1	4,855	160	78	June 1	966	80	34
6/14								
6/15	June 2	36,850	160	114	June 2	5,201	160	126
6/16	June 2	18,609	160	57	June 2	2,983	240	72
6/17	June 2	28,151	160	87	June 2	4,326	160	105
6/18	June 2	39,529	160	122	June 2	3,155	80	77
6/19								
6/20	June 3	23,909	200	75	June 3	3,977	240	93
6/21	June 3	15,204	159	48	June 3	4,975	160	116
6/22	June 3	41,570	160	131	June 3	4,448	160	104
6/23	June 3	39,760	160	126	June 3	2,893	80	67
6/24								
6/25	June 4	15,901	280	106	June 4	597	80	80
6/26	June 4	25,685	240	170	June 4	193	80	80
6/27	June 4	11,366	198	104	June 4	362	63	63
6/28	June 4	4,318			June 4	335		
6/29								
6/30								
7/1								
7/2								
7/3								

-continued-

Table 5.—Page 2 of 4.

Date	Seine				Gillnet			
	Temporal stratum	Harvest	Collected	Selected	Temporal stratum	Harvest	Collected	Selected
7/4								
7/5								
7/6	July 1	27,124	120	119	July 1	202		
7/7	July 1	3,345	148	147	July 1	39		
7/8					July 1			
7/9					July 1			
7/10	July 2	175			July 1	30	10	10
7/11	July 2	644	200	181	July 1	90		
7/12	July 2				July 1			
7/13	July 2				July 1			
7/14	July 2	391	120	120	July 1	186		
7/15	July 2	4,641			July 1	302		
7/16	July 2				July 1			
7/17	July 2				July 1			
7/18	July 2	59			July 1	141		
7/19	July 2	67			July 1	348	80	79
7/20	July 2				July 1			
7/21	July 2				July 1			
7/22	July 2	5,831			July 1	640	154	152
7/23	July 2				July 1	49		
7/24	July 2							
7/25	July 2							
7/26	July 2	264			July 2	1,649	293	224
7/27	July 2	1,377			July 2	213		
7/28	July 2				July 2			
7/29	July 2				July 2	105		
7/30	July 2	527	80	79	July 2	1,599	160	156
7/31	July 2	125			July 2	197		

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Table 5.—Page 3 of 4.

Date	Seine				Gillnet			
	Temporal stratum	Harvest	Collected	Selected	Temporal stratum	Harvest	Collected	Selected
8/1								
8/2								
8/3								
8/4								
8/5								
8/6								
8/7								
8/8								
8/9								
8/10								
8/11								
8/12								
8/13								
8/14								
8/15	August 1	4,186	129	129		113		
8/16	August 1	14,621	119	80		527	16	
8/17	August 2	4,849	130	129		209		
8/18	August 2	2,021	30	30		93		
8/19	August 2	1,660						
8/20	August 2	779	80	77		188		
8/21	August 2		40	40				
8/22	August 2	276				59		
8/23	August 2	393	40	40		463		
8/24	August 2	19						
8/25	August 2	3	34	34				
8/26	August 2	14						
8/27	August 2	3	5	4				
8/28	August 2							

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Table 5.—Page 4 of 4.

Date	Seine				Gillnet			
	Temporal stratum	Harvest	Collected	Selected	Temporal stratum	Harvest	Collected	Selected
8/29	August 2							
8/30	August 2							
8/31	August 2							

Note: Blank cells indicate no data available because no harvest or samples were taken on those days.

Table 6.—Southeastern and South Central Districts, South Alaska Peninsula area, 2022. Commercial harvest, number of samples collected, and number of samples selected for genetic analysis, provided by date and grouped by gear type and temporal stratum.

Date	Seine				Gillnet			
	Temporal stratum	Harvest	Collected	Selected	Temporal Stratum	Harvest	Collected	Selected
6/6					June 1	350	80	12
6/7					June 1	676	40	24
6/8					June 1	179	40	6
6/9					June 1			
6/10					June 1	477	40	17
6/11	June 1	5,383	240	142	June 1	1,029	40	36
6/12	June 1	8,338	160	160	June 1	120	22	4
6/13	June 1	2,698	160	78	June 1	223	34	8
6/14					June 1			
6/15	June 2	26,026	200	200	June 1	199	40	7
6/16	June 2	15,824	240	180	June 1	521	80	19
6/17					June 1	677	40	31
6/18					June 1	365		
6/19					June 1			
6/20	June 3	21,323	240	236	June 1	582	40	27
6/21	June 3	12,958	240	144	June 1	242	40	9
6/22					June 1	460	40	16
6/23					June 1	236	40	8
6/24					June 1	9		
6/25	June 4	60,377	240	240	June 1	542	80	19
6/26	June 4	16,112	240	140	June 1	531	120	50
6/27					June 1	1,714		
6/28					June 1	1,617	120	87
6/29								
6/30								

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Table 6.—Page 2 of 4.

Date	Seine				Gillnet			
	Temporal stratum	Harvest	Collected	Selected	Temporal stratum	Harvest	Collected	Selected
7/1								
7/2								
7/3								
7/4								
7/5								
7/6	July 1	23,013	200	192	July 1	734	80	68
7/7	July 1	3,388	200	28	July 1	677	120	48
7/8	July 1				July 1			
7/9	July 1				July 1			
7/10	July 1	5,902	200	49	July 1	576	80	56
7/11	July 1	401	200	4	July 1	300	80	35
7/12	July 1				July 1		24	3
7/13	July 1				July 1			
7/14	July 1	12,822	320	107	July 1	1,158	160	111
7/15	July 2	2,611	80	42	July 1	369	160	41
7/16	July 2				July 1		24	3
7/17	July 2				July 1			
7/18	July 2	14,380	320	292	July 2	1,626	120	116
7/19	July 2	6,869	50	46	July 2	804	80	78
7/20	July 2				July 2			
7/21	July 2				July 2			
7/22	July 3	18,893	280	127	July 2	1,591	166	127
7/23	July 3		80		July 2	659	80	59
7/24	July 3				July 2			
7/25	July 3				July 2			
7/26	July 3	18,759	400	131	July 3	1,651	120	114
7/27	July 3	724			July 3	512	120	118
7/28	July 3				July 3			

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Table 6.—Page 3 of 4.

Date	Seine				Gillnet			
	Temporal Stratum	Harvest	Collected	Selected	Temporal stratum	Harvest	Collected	Selected
7/29	July 3				July 3			
7/30	July 3	15,835	160	122	July 3	1,671	120	116
7/31	July 3	2,505			July 3	1,034		
8/1	August 1				August			
8/2	August 1				August			
8/3	August 1				August			
8/4	August 1				August		40	40
8/5	August 1	125			August			
8/6	August 1				August		40	40
8/7	August 1				August			
8/8	August 1				August			
8/9	August 1				August		40	40
8/10	August 1				August		37	36
8/11	August 1				August			
8/12	August 1				August			
8/13	August 1				August			
8/14	August 1				August		40	40
8/15	August 1	2,166	200	199	August	9		
8/16	August 1	2,443			August	46	40	40
8/17	August 1	1,929	200	191	August	79	40	40
8/18	August 2	855	80	78	August	103		
8/19	August 2	2,052	80	75	August	33	59	58
8/20	August 2	2,294	21	20	August		40	40
8/21	August 2	109	80	76	August			
8/22	August 2	3,166	40	40	August			
8/23	August 2				August			
8/24	August 2	286			August		42	42

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Table 6.—Page 4 of 4.

Date	Seine				Gillnet			
	Temporal stratum	Harvest	Collected	Selected	Temporal stratum	Harvest	Collected	Selected
8/25	August 2				August			
8/26	August 2				August			
8/27	August 2				August			
8/28	August 2				August			
8/29	August 2				August			
8/30	August 2				August			
8/31	August 2				August			

Note: Blank cells indicate no data available because no harvest or samples were taken on those days.

Table 7.—South Alaska Peninsula area, all strata ($n = 14,869$). Estimates of age composition and mean length (from mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age Class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	1	0.0	0.0	0.0	0.0	1	415.0	415.0	415.0	—
0.2	806	6.3	5.9	6.6	0.2	806	519.8	517.5	522.1	39.0
0.3	8,182	63.9	63.2	64.6	0.4	8,182	552.6	551.9	553.3	36.4
0.4	3,761	29.4	28.7	30.0	0.4	3,761	566.2	565.2	567.1	36.2
0.5	59	0.5	0.4	0.6	0.1	59	592.2	583.0	601.3	42.7
0.6	1	0.0	0.0	0.0	0.0	1	587.0	587.0	587.0	—
Unknown						2,059	555.1	553.9	556.4	35.3
Total	12,810					14,869	553.9	553.4	554.4	38.7

Table 8.—Summary of experimental design used to analyze stock composition of chum salmon harvested in commercial fisheries in the South Alaska Peninsula Management area in 2022 by sampling area, gear type, and temporal stratum including number of fish harvested, genotyped, and included in final analyses.

Sampling area	Gear	Temporal stratum	Dates	Harvest	Genotyped	Final
Southeastern and South Central Districts	Seine	June 1	6/11-13	16,419	380	354
Southeastern and South Central Districts	Seine	June 2	6/15-16	41,246	380	364
Southeastern and South Central Districts	Seine	June 3	6/20-21	34,281	380	363
Southeastern and South Central Districts	Seine	June 4	6/25-26	75,336	380	368
Southeastern and South Central Districts	Gillnet	June	6/6-28	10,729	380	357
Unimak and Southwestern Districts	Seine	June 1	6/11-13	24,254	380	346
Unimak and Southwestern Districts	Seine	June 2	6/15-18	123,139	380	344
Unimak and Southwestern Districts	Seine	June 3	6/20-23	120,443	380	321
Unimak and Southwestern Districts	Seine	June 4	6/25-28	54,039	380	343
Unimak and Southwestern Districts	Gillnet	June 1	6/11-13	10,797	380	347
Unimak and Southwestern Districts	Gillnet	June 2	6/15-18	15,665	380	339
Unimak and Southwestern Districts	Gillnet	June 3	6/20-23	16,302	380	345
Unimak and Southwestern Districts	Gillnet	June 4	6/25-28	1,487	223	214
Southeastern and South Central Districts	Seine	July 1	7/6-14	32,704	380	369
Southeastern and South Central Districts	Seine	July 2	7/15-21	36,682	380	353
Southeastern and South Central Districts	Seine	July 3	7/22-31	56,716	380	354
Southeastern and South Central Districts	Gillnet	July 1	7/6-17	4,092	365	329
Southeastern and South Central Districts	Gillnet	July 2	7/18-25	4,833	380	355
Southeastern and South Central Districts	Gillnet	July 3	7/26-31	5,189	348	308
Unimak and Southwestern Districts	Seine	July 1	7/6-7	30,008	266	246
Unimak and Southwestern Districts	Seine	July 2	7/8-31	12,708	380	322
Unimak and Southwestern Districts	Gillnet	July 1	7/6-24	2,027	241	226
Unimak and Southwestern Districts	Gillnet	July 2	7/25-31	3,812	380	334
Southeastern and South Central Districts	Seine	August 1	8/1-17	35,706	390	355
Southeastern and South Central Districts	Seine	August 2	8/18-31	9,793	289	279
Unimak and Southwestern Districts	Seine	August 1	8/15-16	18,807	209	183
Unimak and Southwestern Districts	Seine	August 2	8/17-31	10,017	354	312
South Peninsula	Gillnet	August	8/1-31	7,048	432	397
Total				814,279	9,957	9,127

Table 9.—Results of laboratory quality control analyses among collections including the numbers of fish genotyped in the original and quality control projects; the numbers of homozygote-homozygote, homozygote-heterozygote and total conflicts; and overall concordance and error rates.

Collection	Number of fish in:		Genotypes Compared	Conflicts			Rate	
	Project	QC		Homo-homo	Homo-het	Total	Concordance	Error
Drift gillnet	1,698	147	14,112	0	84	84	99.4%	0.3%
Set gillnet	2,191	187	17,952	0	130	130	99.3%	0.4%
Seine	6,068	507	48,672	17	227	244	99.5%	0.3%
All	9,957	841	80,736	17	441	458	99.4%	0.3%

Table 10.—Southeastern and South Central Districts, South Alaska Peninsula area, June 2022, seine, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 167,198; 4 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	57.7	55.3	60.3	57.8	1.5	96,495	90,767	102,520	96,566	3,605
Kotzebue Sound	4.1	3.0	5.5	4.1	0.8	6,787	4,906	9,174	6,895	1,305
CWAK	13.4	11.7	15.3	13.4	1.1	22,390	19,248	25,759	22,437	1,977
Upper Yukon	0.1	0.0	0.3	0.1	0.1	142	12	573	199	201
Northern Dist.	0.2	0.0	0.8	0.3	0.3	306	5	1,290	423	437
Northwestern Dist.	0.6	0.2	1.3	0.6	0.4	983	314	2,206	1,078	589
South Peninsula	2.2	0.7	3.8	2.2	0.9	3,620	1,192	6,333	3,690	1,549
Chignik/Kodiak	2.9	1.4	4.6	2.9	1.0	4,813	2,307	7,620	4,870	1,633
East of Kodiak	18.5	16.7	20.6	18.6	1.2	30,956	27,656	34,782	31,039	2,184
Total									167,198	

Note: Harvest is the number of chum salmon reported to have been harvested in the June seine fisheries of the Southeastern and South Central Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 11.—Southeastern and South Central Districts, South Alaska Peninsula area, June 2022, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 177,913; 5 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	55.6	53.4	58.0	55.7	1.4	98,993	93,197	105,109	99,044	3720.9
Kotzebue Sound	3.9	2.9	5.3	4.0	0.7	6,973	5,098	9,466	7,083	1329.6
CWAK	13.4	11.8	15.2	13.5	1.1	23,889	20,767	27,359	23,966	1975.8
Upper Yukon	0.1	0.0	0.3	0.1	0.1	144	14	575	203	201.7
Northern Dist.	0.2	0.0	0.7	0.2	0.2	315	9	1,284	435	438.6
Northwestern Dist.	0.6	0.2	1.2	0.6	0.3	992	316	2,205	1,085	589.6
South Peninsula	2.7	1.3	4.3	2.8	0.9	4,916	2,421	7,706	4,988	1578.8
Chignik/Kodiak	3.7	2.3	5.4	3.8	0.9	6,630	4,082	9,652	6,687	1705.4
East of Kodiak	19.3	17.6	21.2	19.3	1.1	34,377	30,944	38,276	34,422	2211.0
Total									177,913	

Note: Harvest is the number of chum salmon reported to have been harvested in the June fisheries of the Southeastern and South Central Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 12.—Unimak and Southwestern Districts, South Alaska Peninsula area, June 2022, seine, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 321,544; 4 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	61.9	59.4	64.4	61.9	1.5	199,002	186,505	211,858	199,047	7,623
Kotzebue Sound	3.2	1.7	5.0	3.3	1.0	10,369	5,283	16,106	10,511	3,322
CWAK	17.3	15.0	20.0	17.4	1.5	55,707	47,975	64,378	55,866	5,053
Upper Yukon	0.3	0.0	0.8	0.3	0.3	912	57	2,723	1,074	856
Northern Dist.	1.3	0.7	2.1	1.3	0.4	4,128	2,337	6,889	4,289	1,400
Northwestern Dist.	2.3	1.4	3.4	2.3	0.6	7,197	4,542	10,844	7,409	1,953
South Peninsula	2.0	0.8	3.6	2.1	0.9	6,321	2,585	11,482	6,591	2,770
Chignik/Kodiak	1.0	0.2	2.3	1.1	0.6	3,362	655	7,288	3,551	2,090
East of Kodiak	10.3	8.8	12.0	10.3	1.0	33,107	28,196	38,939	33,207	3,257
Total									321,544	

Note: Harvest is the number of chum salmon reported to have been harvested in the June seine fisheries of the Unimak and Southwestern Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 13.—Unimak and Southwestern Districts, South Alaska Peninsula area, June 2022, gillnet, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 44,334; 4 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	38.7	36.2	41.3	38.7	1.6	17,150	15,784	18,575	17,170	857
Kotzebue Sound	4.4	3.0	6.0	4.4	0.9	1,931	1,349	2,669	1,953	409
CWAK	37.5	34.6	40.2	37.4	1.7	16,586	15,170	18,034	16,595	869
Upper Yukon	0.6	0.2	1.3	0.7	0.4	273	70	591	294	158
Northern Dist.	1.7	0.8	2.8	1.7	0.6	742	371	1,239	767	269
Northwestern Dist.	0.9	0.5	1.6	0.9	0.3	404	211	690	421	146
South Peninsula	1.7	0.5	3.0	1.7	0.7	730	234	1,343	754	331
Chignik/Kodiak	2.7	1.3	4.3	2.8	0.9	1,201	576	1,920	1,225	413
East of Kodiak	11.6	10.0	13.3	11.6	1.0	5,140	4,382	5,946	5,155	476
Total									44,334	

Note: Harvest is the number of chum salmon reported to have been harvested in the June gillnet fisheries of the Unimak and Southwestern Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 14.—Unimak and Southwestern Districts, South Alaska Peninsula area, June 2022, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 366,590; 8 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	59.1	56.8	61.4	59.1	1.4	216,593	204,169	229,320	216,680	7,611
Kotzebue Sound	3.4	2.0	4.9	3.4	0.9	12,325	7,304	18,145	12,479	3,337
CWAK	19.7	17.7	22.1	19.8	1.3	72,275	64,375	81,073	72,561	5,099
Upper Yukon	0.3	0.1	0.8	0.4	0.2	1,208	297	3,008	1,367	860
Northern Dist.	1.3	0.8	2.1	1.4	0.4	4,938	3,081	7,610	5,065	1,414
Northwestern Dist.	2.1	1.4	3.1	2.1	0.5	7,668	4,964	11,347	7,849	1,971
South Peninsula	1.9	0.9	3.4	2.0	0.8	7,078	3,229	12,360	7,368	2,821
Chignik/Kodiak	1.3	0.5	2.4	1.3	0.6	4,588	1,806	8,629	4,782	2,133
East of Kodiak	10.5	9.2	11.9	10.5	0.9	38,393	33,188	44,091	38,440	3,297
Total									366,590	

Note: Harvest is the number of chum salmon reported to have been harvested in the June fisheries of the Unimak and Southwestern Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 15.—South Alaska Peninsula area, June 2022, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 544,064; 13 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	58.0	56.2	59.7	58.0	1.1	315,162	302,005	329,874	315,469	8,496
Kotzebue Sound	3.6	2.6	4.7	3.6	0.7	19,397	14,074	25,584	19,540	3,572
CWAK	17.7	16.2	19.4	17.7	1.0	96,116	87,486	106,341	96,466	5,668
Upper Yukon	0.3	0.1	0.6	0.3	0.2	1,392	424	3,290	1,571	903
Northern Dist.	1.0	0.6	1.5	1.0	0.3	5,329	3,349	8,266	5,495	1,491
Northwestern Dist.	1.6	1.1	2.3	1.6	0.4	8,749	5,904	12,435	8,919	2,045
South Peninsula	2.2	1.4	3.3	2.3	0.6	12,102	7,581	17,793	12,336	3,094
Chignik/Kodiak	2.1	1.4	2.9	2.1	0.5	11,294	7,449	16,023	11,456	2,595
East of Kodiak	13.4	12.2	14.6	13.4	0.7	72,712	66,339	79,512	72,812	4,012
Total									544,064	

Note: Harvest is the number of chum salmon reported to have been harvested in the June fisheries of the South Peninsula. Harvest total may differ from totals in experimental design table due to rounding error.

Table 16.—Southeastern and South Central Districts, South Alaska Peninsula area, July 2022, seine, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 126,245; 3 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	12.8	11.2	14.6	12.9	1.0	16,182	14,096	18,508	16,229	1,365
Kotzebue Sound	0.1	0.0	0.4	0.1	0.2	110	0	570	175	196
CWAK	1.5	0.9	2.2	1.5	0.4	1,874	1,170	2,775	1,907	496
Upper Yukon	0.0	0.0	0.2	0.0	0.1	20	0	258	59	95
Northern Dist.	0.3	0.0	0.9	0.3	0.3	328	43	1,170	429	384
Northwestern Dist.	0.9	0.3	2.2	1.0	0.6	1,085	324	2,823	1,273	795
South Peninsula	27.3	22.4	32.1	27.3	3.0	34,454	27,996	40,963	34,521	3,955
Chignik/Kodiak	16.2	11.8	21.2	16.4	2.9	20,371	14,801	26,887	20,646	3,695
East of Kodiak	40.4	37.8	43.1	40.4	1.6	50,977	46,812	55,424	51,007	2,546
Total									126,245	

Note: Harvest is the number of chum salmon reported to have been harvested in the July seine fisheries of the Southeastern and South Central Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 17.—Southeastern and South Central Districts, South Alaska Peninsula area, July 2022, gillnet, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 14,106; 3 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	1.0	0.5	1.7	1.1	0.4	143	76	244	149	52
Kotzebue Sound	0.3	0.1	0.7	0.3	0.2	41	10	97	45	27
CWAK	0.5	0.2	1.0	0.5	0.2	69	24	139	73	35
Upper Yukon	0.0	0.0	0.2	0.0	0.1	1	0	21	5	9
Northern Dist.	0.0	0.0	0.7	0.2	0.3	6	0	97	22	37
Northwestern Dist.	0.3	0.0	1.0	0.3	0.4	36	0	147	49	50
South Peninsula	33.5	27.7	40.4	33.7	3.9	4,719	3,864	5,759	4,749	570
Chignik/Kodiak	44.0	37.1	50.2	43.8	4.0	6,178	5,183	7,128	6,183	589
East of Kodiak	20.0	17.5	22.6	20.1	1.6	2,822	2,462	3,223	2,830	237
Total									14,106	

Note: Harvest is the number of chum salmon reported to have been harvested in the July gillnet fisheries of the Southeastern and South Central and Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 18.—Southeastern and South Central Districts, South Alaska Peninsula area, July 2022, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 140,191; 6 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	11.6	10.2	13.2	11.7	0.9	16,298	14,196	18,740	16,366	1,372
Kotzebue Sound	0.1	0.0	0.4	0.2	0.1	158	31	609	221	199
CWAK	1.4	0.9	2.0	1.4	0.4	1,945	1,255	2,851	1,981	496
Upper Yukon	0.0	0.0	0.2	0.0	0.1	27	1	264	64	95
Northern Dist.	0.3	0.0	0.8	0.3	0.3	354	62	1,187	450	383
Northwestern Dist.	0.8	0.3	2.0	0.9	0.6	1,146	363	2,844	1,322	799
South Peninsula	28.1	23.6	32.3	28.0	2.7	39,290	32,803	45,446	39,210	3,853
Chignik/Kodiak	19.0	15.1	23.4	19.1	2.6	26,594	21,058	33,092	26,808	3,700
East of Kodiak	38.4	36.0	40.8	38.4	1.5	53,755	49,459	58,162	53,769	2,626
Total									140,191	

Note: Harvest is the number of chum salmon reported to have been harvested in the July fisheries of the Southeastern and South Central Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 19.—Unimak and Southwestern Districts, South Alaska Peninsula area, July 2022, seine, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 42,634; 2 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	31.1	27.3	35.0	31.1	2.3	13,212	11,486	15,193	13,259	1,139
Kotzebue Sound	4.1	2.0	6.8	4.3	1.4	1,772	869	2,892	1,824	617
CWAK	12.4	9.3	15.9	12.5	2.0	5,266	3,960	6,902	5,321	886
Upper Yukon	0.0	0.0	0.3	0.1	0.1	2	0	124	23	55
Northern Dist.	4.5	2.0	7.6	4.6	1.7	1,923	845	3,259	1,973	734
Northwestern Dist.	5.5	3.5	8.0	5.6	1.4	2,360	1,470	3,424	2,387	590
South Peninsula	10.0	7.2	13.7	10.2	2.0	4,266	3,081	5,824	4,332	845
Chignik/Kodiak	11.7	7.9	15.9	11.8	2.5	4,994	3,321	6,836	5,027	1,071
East of Kodiak	19.9	16.6	23.3	19.9	2.0	8,458	7,025	10,090	8,488	923
Total									42,634	

Note: Harvest is the number of chum salmon reported to have been harvested in the July seine fisheries of the Unimak and Southwestern Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 20.—Unimak and Southwestern Districts, South Alaska Peninsula area, July 2022, gillnet, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 5,844; 2 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	2.4	1.4	3.8	2.5	0.7	142	83	220	145	42
Kotzebue Sound	0.0	0.0	0.2	0.0	0.1	0	0	14	3	6
CWAK	1.2	0.5	2.5	1.3	0.6	71	27	144	77	36
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	12	2	5
Northern Dist.	1.4	0.0	3.3	1.5	1.0	80	2	192	86	61
Northwestern Dist.	7.5	4.8	10.7	7.6	1.8	439	279	626	444	107
South Peninsula	57.3	49.9	66.4	57.5	5.0	3,339	2,863	3,931	3,362	324
Chignik/Kodiak	18.2	9.8	25.8	18.2	4.9	1,061	576	1,520	1,061	288
East of Kodiak	11.3	8.8	14.1	11.4	1.6	661	518	828	664	93
Total									5,844	

Note: Harvest is the number of chum salmon reported to have been harvested in the July gillnet fisheries of the Unimak and Southwestern Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 21.—Unimak and Southwestern Districts, South Alaska Peninsula area, July 2022, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 48,558; 4 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	27.6	24.3	31.1	27.7	2.1	13,410	11,651	15,321	13,439	1,141
Kotzebue Sound	3.7	1.8	6.0	3.8	1.3	1,787	869	2,922	1,835	627
CWAK	11.1	8.4	14.1	11.1	1.8	5,354	4,029	6,913	5,413	890
Upper Yukon	0.0	0.0	0.3	0.1	0.1	6	0	127	26	56
Northern Dist.	4.2	1.9	6.9	4.3	1.5	2,030	937	3,366	2,066	743
Northwestern Dist.	5.8	4.0	8.0	5.8	1.2	2,797	1,928	3,914	2,836	603
South Peninsula	15.7	13.0	19.0	15.8	1.9	7,637	6,305	9,286	7,684	900
Chignik/Kodiak	12.5	8.9	16.3	12.5	2.3	6,053	4,339	7,943	6,089	1,107
East of Kodiak	18.9	16.0	21.9	18.9	1.8	9,143	7,671	10,723	9,171	939
Total									48,558	

Note: Harvest is the number of chum salmon reported to have been harvested in the July fisheries of the Unimak and Southwestern Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 22.—South Alaska Peninsula area, July 2022, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 188,770; 10 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	15.8	14.3	17.2	15.8	0.9	29,792	26,966	32,675	29,806	1,748
Kotzebue Sound	1.1	0.6	1.7	1.1	0.3	2,006	1,038	3,198	2,054	644
CWAK	3.9	3.1	4.9	3.9	0.5	7,360	5,797	9,205	7,392	1,007
Upper Yukon	0.0	0.0	0.2	0.0	0.1	49	3	315	90	109
Northern Dist.	1.3	0.6	2.1	1.3	0.4	2,478	1,226	3,982	2,518	829
Northwestern Dist.	2.1	1.5	3.1	2.2	0.5	4,040	2,793	5,907	4,159	972
South Peninsula	24.9	21.5	28.2	24.8	2.0	46,958	40,441	53,375	46,892	3,928
Chignik/Kodiak	17.4	14.2	20.8	17.4	2.0	32,897	26,817	39,192	32,907	3,827
East of Kodiak	33.4	31.4	35.3	33.3	1.2	63,004	58,227	67,566	62,952	2,794
Total									188,770	

Note: Harvest is the number of chum salmon reported to have been harvested in the July fisheries of the South Peninsula. Harvest total may differ from totals in experimental design table due to rounding error.

Table 23.—Southeastern and South Central Districts, South Alaska Peninsula area, August 2022, seine, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 45,566; 2 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	1.8	1.0	3.0	1.9	0.6	824	474	1,348	856	265
Kotzebue Sound	0.0	0.0	0.5	0.1	0.2	7	0	211	44	81
CWAK	0.1	0.0	0.7	0.2	0.2	55	0	313	93	108
Upper Yukon	0.0	0.0	0.2	0.0	0.1	2	0	84	16	36
Northern Dist.	0.0	0.0	0.9	0.1	0.3	6	0	384	67	157
Northwestern Dist.	0.0	0.0	0.7	0.2	0.4	11	0	307	71	161
South Peninsula	41.1	33.2	48.9	41.1	4.7	18,677	15,045	22,530	18,713	2,288
Chignik/Kodiak	52.1	44.3	60.1	52.2	4.8	23,701	19,852	27,918	23,783	2,400
East of Kodiak	4.2	2.8	5.9	4.2	0.9	1,892	1,278	2,687	1,924	433
Total									45,566	

Note: Harvest is the number of chum salmon reported to have been harvested in the August seine fisheries of the Southeastern and South Central Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 24.—Unimak and Southwestern Districts, South Alaska Peninsula area, August 2022, seine, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 28,821; 2 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	0.0	0.0	0.4	0.1	0.2	3	0	120	24	56
Kotzebue Sound	0.0	0.0	0.3	0.1	0.1	2	0	82	16	37
CWAK	0.0	0.0	0.3	0.1	0.1	2	0	84	16	38
Upper Yukon	0.0	0.0	0.3	0.1	0.1	2	0	73	15	34
Northern Dist.	0.0	0.0	1.1	0.2	0.4	10	0	311	61	122
Northwestern Dist.	4.9	3.6	6.8	5.0	1.0	1,422	1,033	1,962	1,452	286
South Peninsula	88.0	77.1	94.2	87.2	5.4	25,252	21,971	27,985	25,141	1,826
Chignik/Kodiak	5.5	0.0	16.3	6.4	5.3	1,591	3	4,707	1,856	1,528
East of Kodiak	0.7	0.3	1.7	0.8	0.5	211	75	505	239	139
Total									28,821	

Note: Harvest is the number of chum salmon reported to have been harvested in the August seine fisheries of the Unimak and Southwestern Districts. Harvest total may differ from totals in experimental design table due to rounding error.

Table 25.—South Alaska Peninsula area, August 2022, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 81,418; 5 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	1.1	0.6	1.7	1.1	0.3	863	495	1,401	895	273
Kotzebue Sound	0.0	0.0	0.3	0.1	0.1	25	0	241	62	90
CWAK	0.1	0.0	0.4	0.1	0.1	74	2	345	111	115
Upper Yukon	0.0	0.0	0.2	0.0	0.1	13	0	127	32	50
Northern Dist.	0.1	0.0	0.7	0.2	0.2	52	1	545	134	199
Northwestern Dist.	1.8	1.3	2.6	1.9	0.4	1,486	1,075	2,094	1,527	325
South Peninsula	59.5	53.4	65.0	59.4	3.5	48,335	43,244	53,551	48,363	3,119
Chignik/Kodiak	34.3	28.7	40.3	34.3	3.5	27,862	23,130	32,925	27,952	2,977
East of Kodiak	2.8	2.0	3.8	2.9	0.6	2,312	1,649	3,139	2,341	459
Total									81,418	

Note: Harvest is the number of chum salmon reported to have been harvested in the August fisheries of the South Peninsula. Harvest total may differ from totals in experimental design table due to rounding error.

Table 26.—South Alaska Peninsula area, post-June 2022, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 270,065; 15 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	11.3	10.3	12.4	11.4	0.6	30,613	27,636	33,731	30,674	1,813
Kotzebue Sound	0.8	0.4	1.2	0.8	0.2	2,050	1,085	3,284	2,113	658
CWAK	2.8	2.2	3.4	2.8	0.4	7,453	5,864	9,247	7,490	1,015
Upper Yukon	0.0	0.0	0.1	0.0	0.0	83	12	377	122	120
Northern Dist.	1.0	0.5	1.5	1.0	0.3	2,567	1,344	4,139	2,644	842
Northwestern Dist.	2.1	1.6	2.8	2.1	0.4	5,538	4,209	7,483	5,678	1,029
South Peninsula	35.3	32.3	38.2	35.3	1.8	95,124	86,896	103,572	95,237	5,005
Chignik/Kodiak	22.6	19.7	25.4	22.5	1.7	60,922	52,988	68,848	60,864	4,787
East of Kodiak	24.2	22.7	25.6	24.2	0.9	65,173	60,585	69,752	65,242	2,726
Total									270,065	

Note: Harvest is the number of chum salmon reported to have been harvested in the post-June fisheries of the South Peninsula. Harvest total may differ from totals in experimental design table due to rounding error.

Table 27.—South Alaska Peninsula area, 2022, all strata. Reporting group-specific stock composition and harvest estimates. Median, 90% credibility intervals, means, and SDs are reported.

Reporting group	Proportions (%)					Harvest = 814,077; 28 strata				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	42.5	41.2	43.8	42.5	0.8	345,896	332,176	360,562	346,062	8,641
Kotzebue Sound	2.6	2.0	3.4	2.7	0.4	21,531	15,905	27,774	21,655	3,656
CWAK	12.8	11.7	13.9	12.8	0.7	103,798	95,108	113,928	103,945	5,627
Upper Yukon	0.2	0.1	0.4	0.2	0.1	1,522	507	3,464	1,692	912
Northern Dist.	1.0	0.7	1.4	1.0	0.2	7,999	5,597	11,231	8,139	1,701
Northwestern Dist.	1.8	1.4	2.3	1.8	0.3	14,487	11,033	18,636	14,596	2,296
South Peninsula	13.2	12.0	14.4	13.2	0.7	107,559	98,140	117,513	107,613	5,965
Chignik/Kodiak	8.9	7.9	10.0	8.9	0.7	72,050	64,090	81,259	72,289	5,415
East of Kodiak	16.9	16.1	17.9	17.0	0.5	137,944	130,503	146,152	138,086	4,788
Total									814,077	

Note: Harvest is the number of chum salmon reported to have been harvested in the fisheries of the South Peninsula. Harvest total may differ from totals in experimental design table due to rounding error.

Table 28.—Harvests of Asia and Coastal Western Alaska (CWAK) chum salmon among strata analyzed in 2022 in the Southeastern and South Central (SE/SC) and Unimak and Southwestern (Un/SW) Districts and South Alaska Peninsula (SAP) area as a whole. Mean harvest estimate, associated percentage of total chum harvested for each stock, and the ratio of Asia to CWAK harvests are reported. Annual totals from the WASSIP years (2007–2009) are also provided.

Area	Gear	Temporal stratum	Dates	Asia		CWAK		Asia:CWAK ratio
				Harvest	% of Harvest	Harvest	% of Harvest	
SE/SC	Seine	June 1	6/11–13	10,620	3.1	2,665	2.6	3.98
SE/SC	Seine	June 2	6/15–16	22,969	6.6	7,063	6.8	3.25
SE/SC	Seine	June 3	6/20–21	20,421	5.9	3,471	3.3	5.88
SE/SC	Seine	June 4	6/25–26	42,604	12.3	9,243	8.9	4.61
SE/SC	Gillnet	June	6/6–28	2,489	0.7	1,538	1.5	1.62
Un/SW	Seine	June 1	6/11–13	11,838	3.4	5,796	5.6	2.04
Un/SW	Seine	June 2	6/15–18	71,763	20.7	27,032	26.0	2.65
Un/SW	Seine	June 3	6/20–23	82,649	23.9	16,074	15.5	5.14
Un/SW	Seine	June 4	6/25–28	33,003	9.5	7,031	6.8	4.69
Un/SW	Gillnet	June 1	6/11–13	4,351	1.3	3,764	3.6	1.16
Un/SW	Gillnet	June 2	6/15–18	5,582	1.6	6,359	6.1	0.88
Un/SW	Gillnet	June 3	6/20–23	6,681	1.9	6,048	5.8	1.10
Un/SW	Gillnet	June 4	6/25–28	523	0.2	393	0.4	1.33
SE/SC	Seine	July 1	7/6–14	7,397	2.1	1,244	1.2	5.95
SE/SC	Seine	July 2	7/15–21	5,384	1.6	282	0.3	19.09
SE/SC	Seine	July 3	7/22–31	3,430	1.0	379	0.4	9.05
SE/SC	Gillnet	July 1	7/6–17	41	0.0	27	0.0	1.54
SE/SC	Gillnet	July 2	7/18–25	57	0.0	45	0.0	1.28
SE/SC	Gillnet	July 3	7/26–31	51	0.0	2	0.0	22.19
Un/SW	Seine	July 1	7/6–7	11,241	3.2	4,371	4.2	2.57
Un/SW	Seine	July 2	7/8–31	2,046	0.6	962	0.9	2.13
Un/SW	Gillnet	July 1	7/6–24	82	0.0	41	0.0	2.01
Un/SW	Gillnet	July 2	7/25–31	63	0.0	36	0.0	1.76

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Table 28.–Page 2 of 2.

Area	Gear	Temporal stratum	Dates	Asia		CWAK		Asia:CWAK Ratio
				Harvest	% of Harvest	Harvest	% of Harvest	
SE/SC	Seine	August 1	8/1–17	712	0.2	89	0.1	8.04
SE/SC	Seine	August 2	8/18–31	143	0.0	4	0.0	36.12
Un/SW	Seine	August 1	8/15–16	18	0.0	13	0.0	1.40
Un/SW	Seine	August 2	8/17–31	6	0.0	4	0.0	1.65
SAP	Gillnet	August	8/1–31	15	0.0	2	0.0	7.23
SAP	All	All	2022	346,182	100	103,978	100	3.33
SAP	All	All	2007	101,357	100	189,975	100	0.53
SAP	All	All	2008	157,791	100	222,251	100	0.71
SAP	All	All	2009	196,142	100	440,403	100	0.45

Note: Total harvests of Asia and CWAK in South Alaska Peninsula fisheries in 2007–2009 are taken from tables 152–154 and 158–160 of Munro et al. 2012.

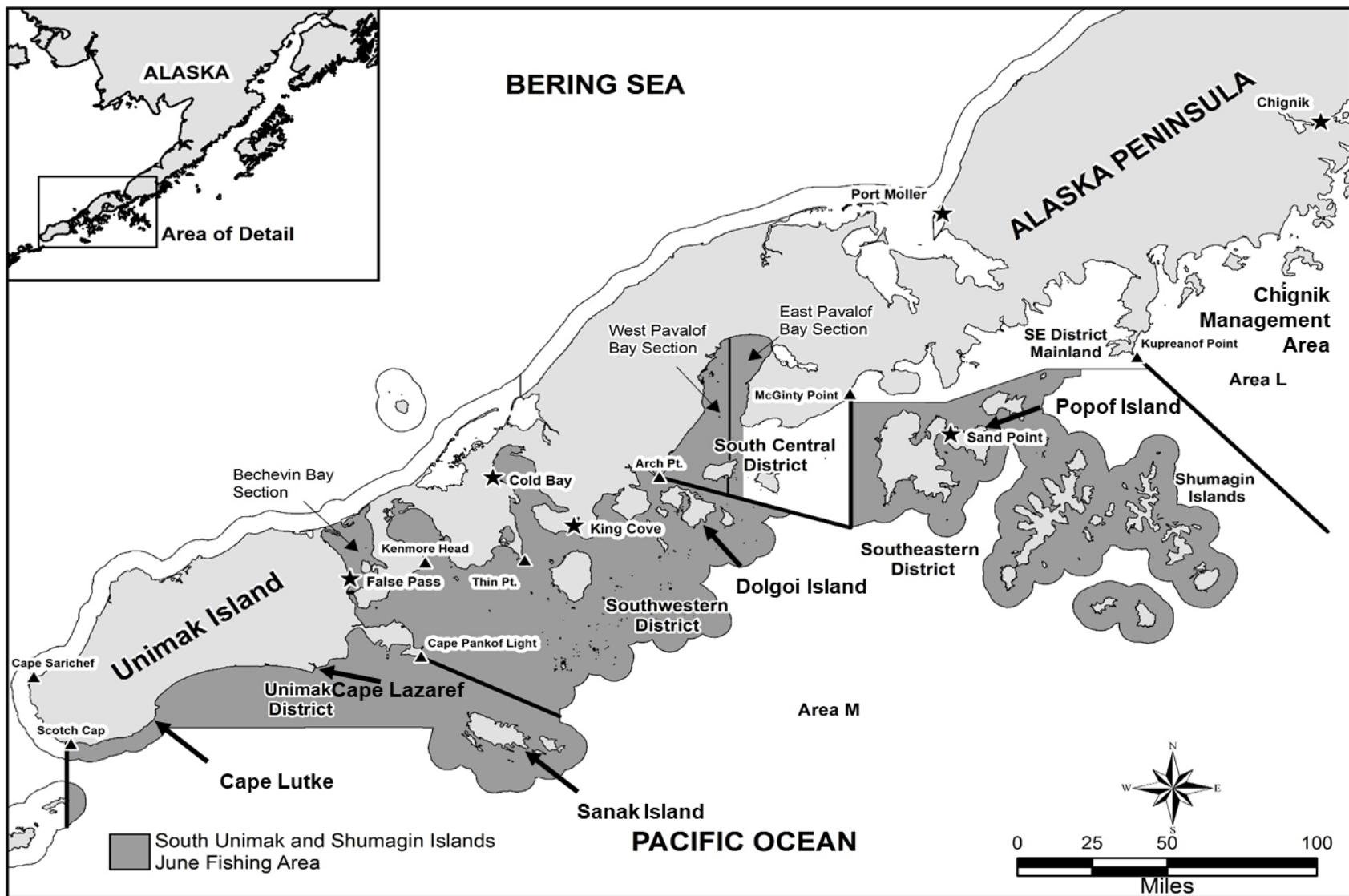


Figure 1.—Map of the South Alaska Peninsula Management area and the locations of the South Unimak and Shumagin Islands June fisheries.

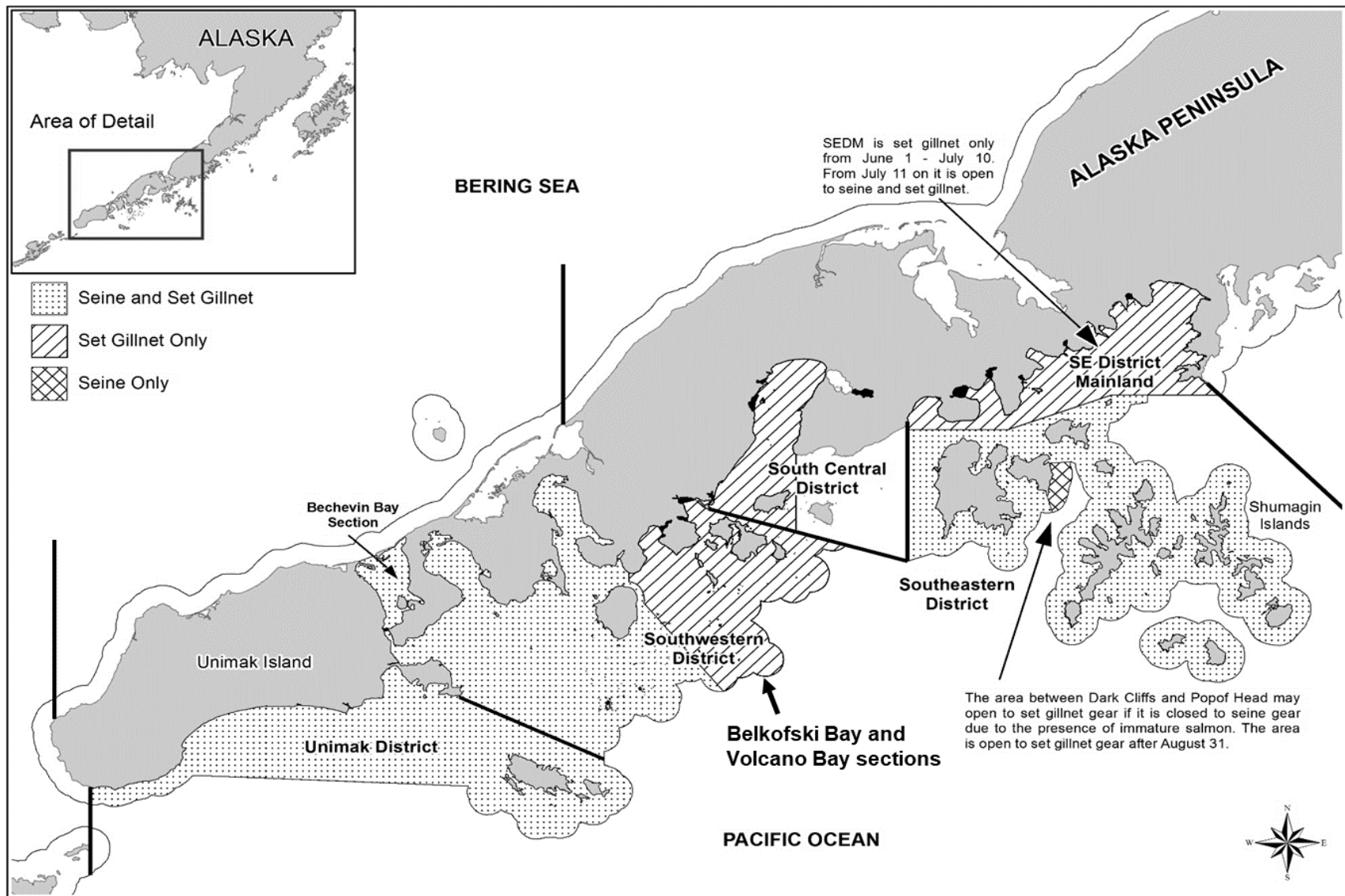


Figure 2.—Map depicting the locations of June South Alaska Peninsula fisheries for purse seine and set gillnet gear.

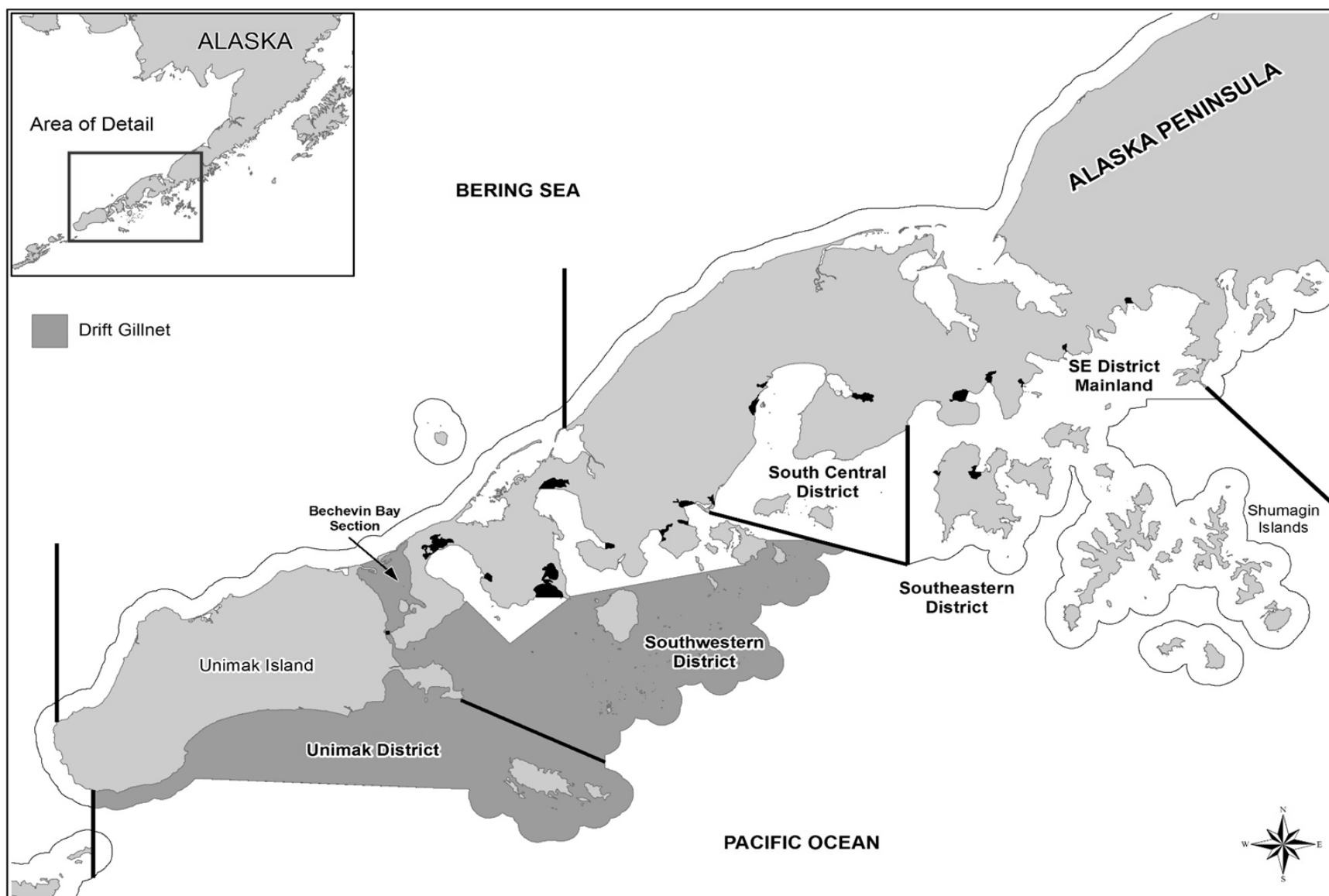


Figure 3.—Map depicting the locations of June South Alaska Peninsula fishery for drift gillnet gear.

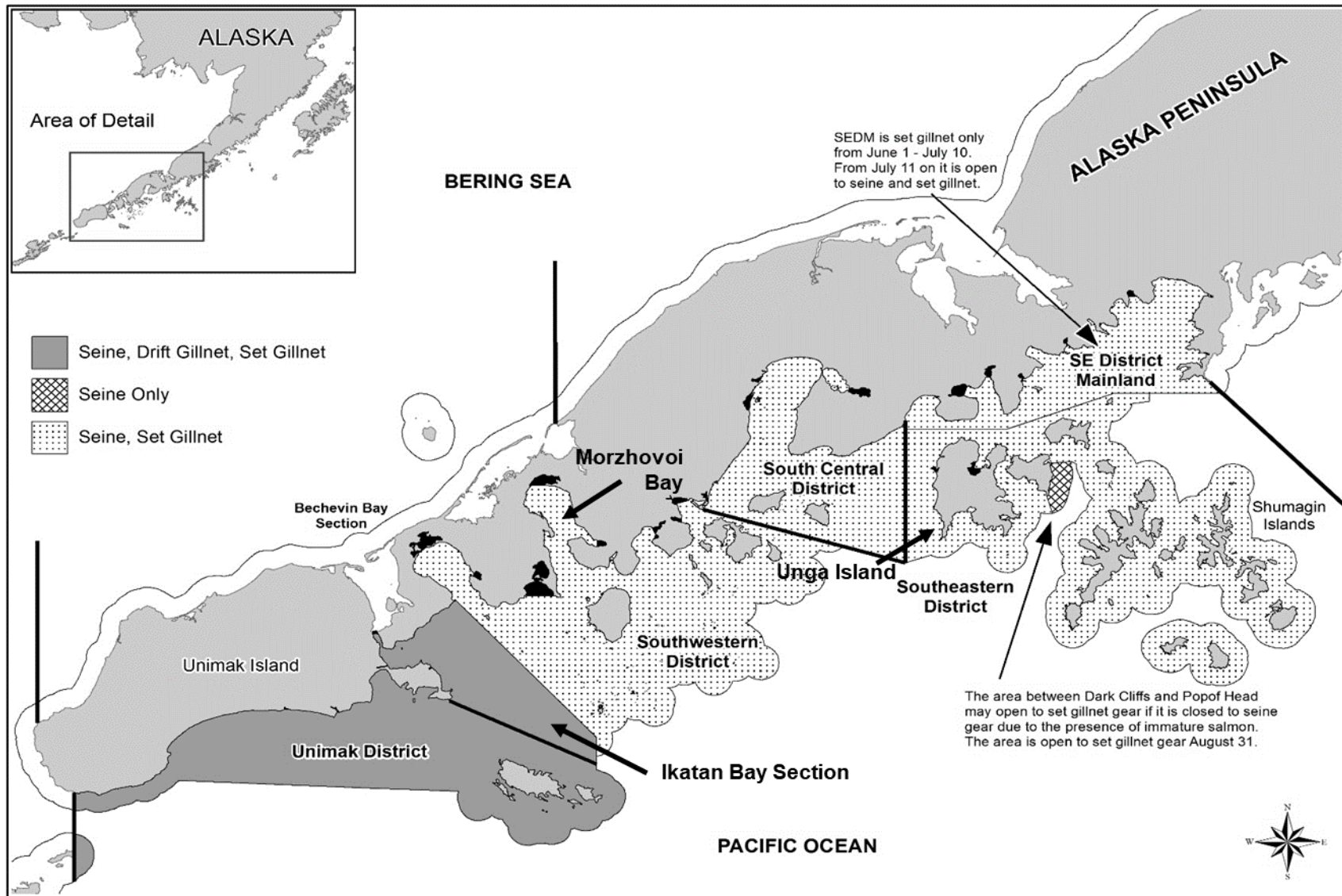


Figure 4.—Map depicting the locations of post-June South Alaska Peninsula fisheries and permitted gear types.

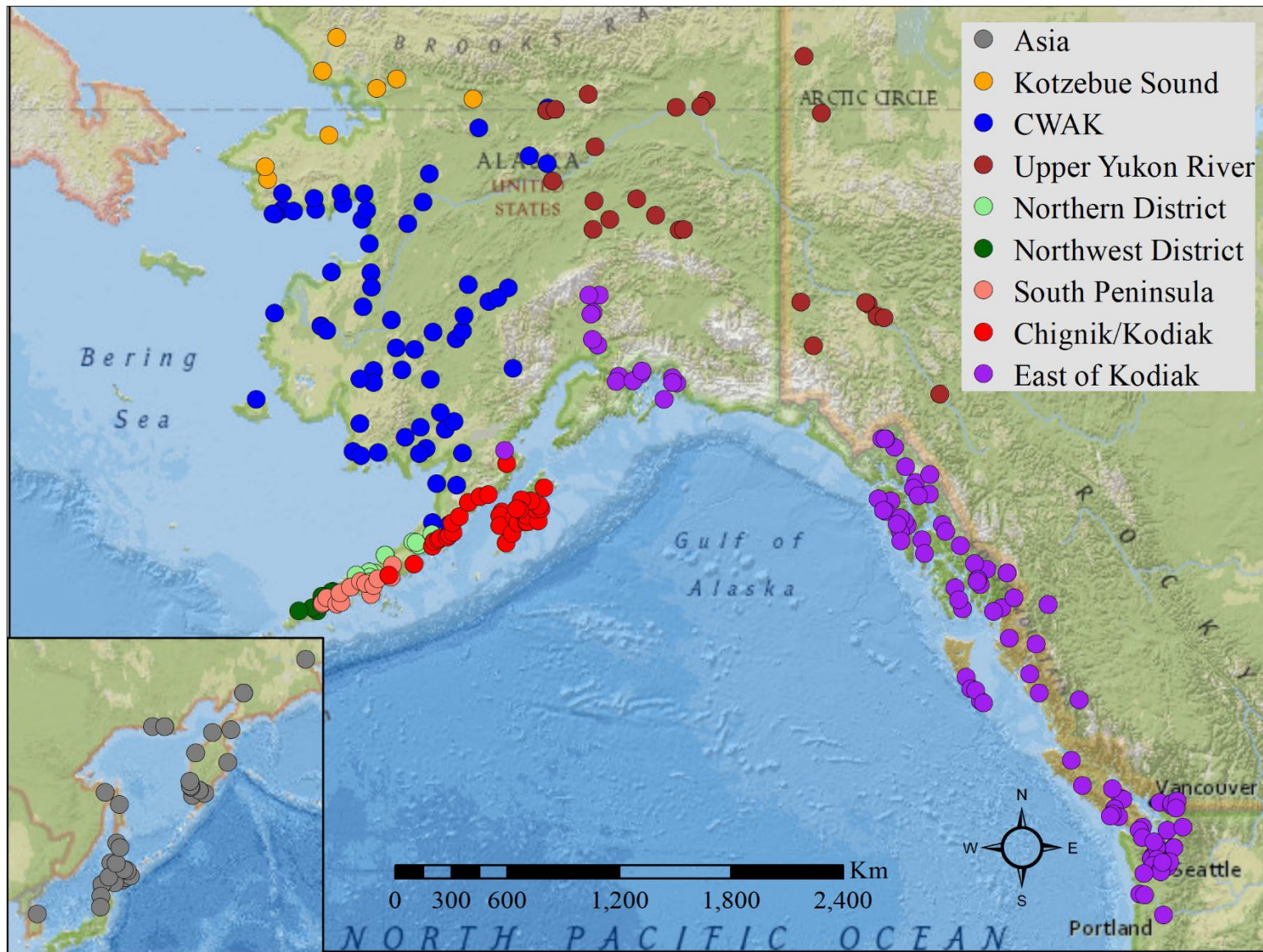


Figure 5.—The location and reporting group affiliation of 310 populations of chum salmon included in the WASSIP baseline.

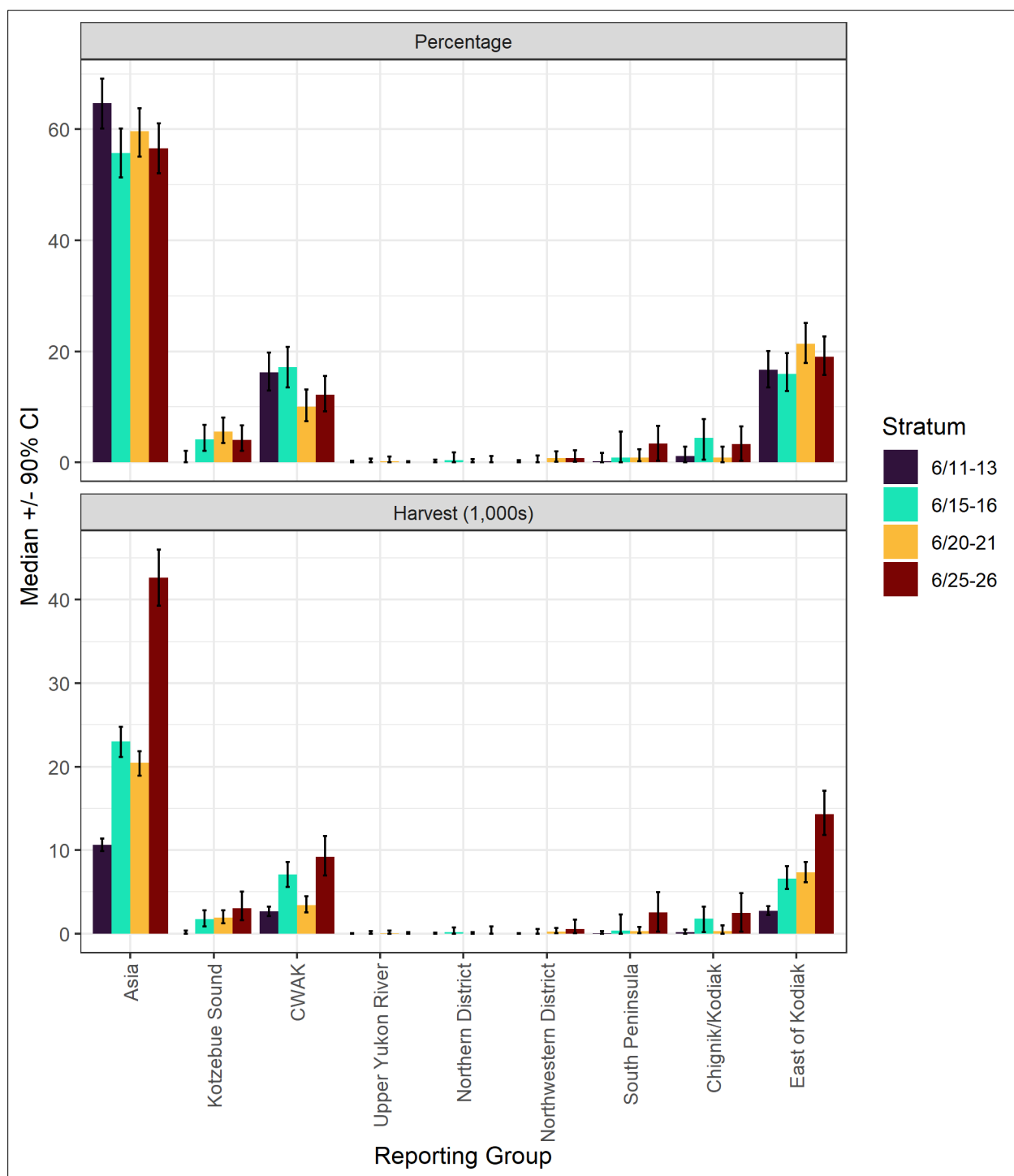


Figure 6.—Median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals by temporal stratum for chum salmon sampled from the seine fishery in the Southeastern and South Central Districts in June 2022.

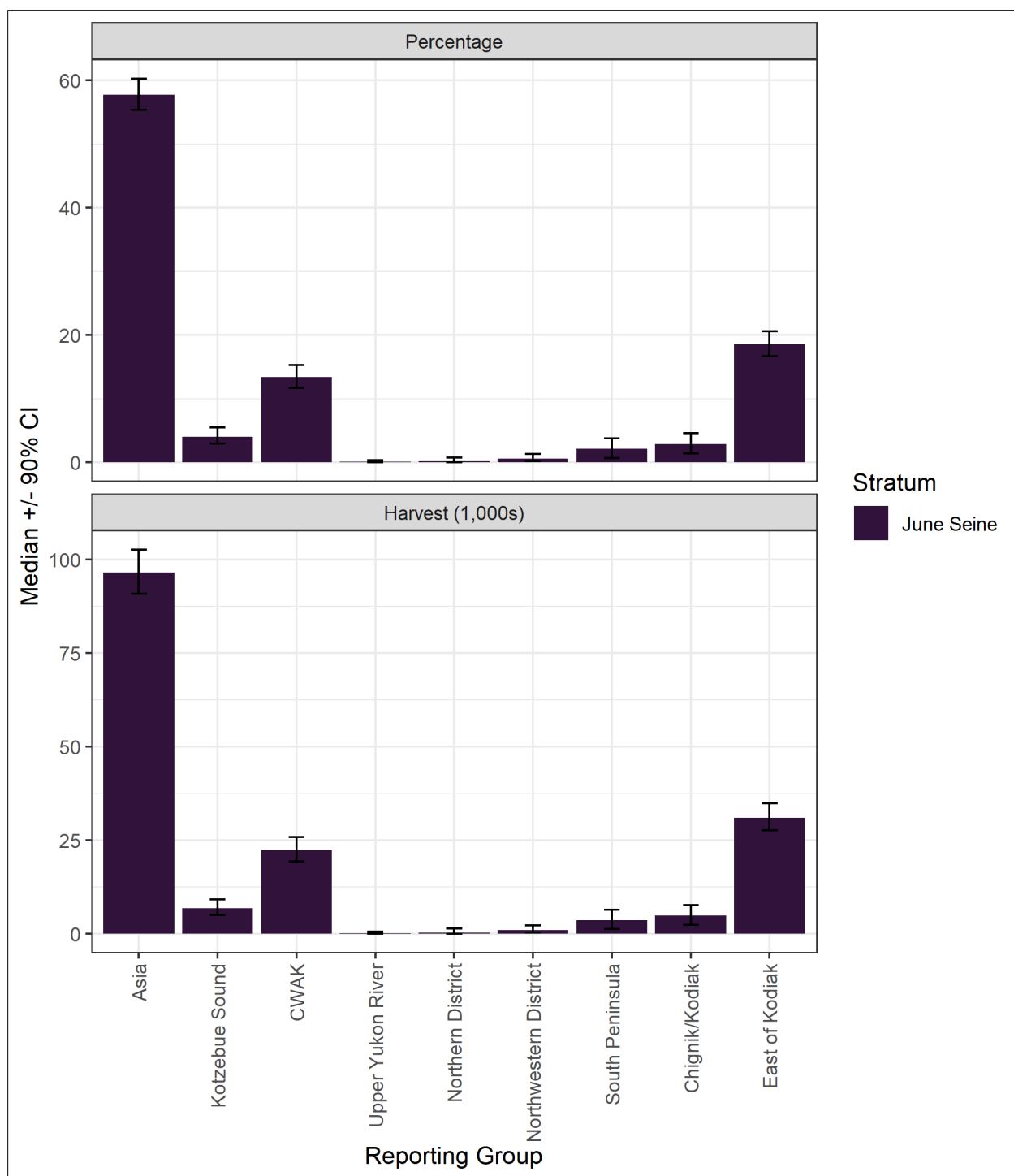


Figure 7.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from the seine fishery in the Southeastern and South Central Districts in June 2022.

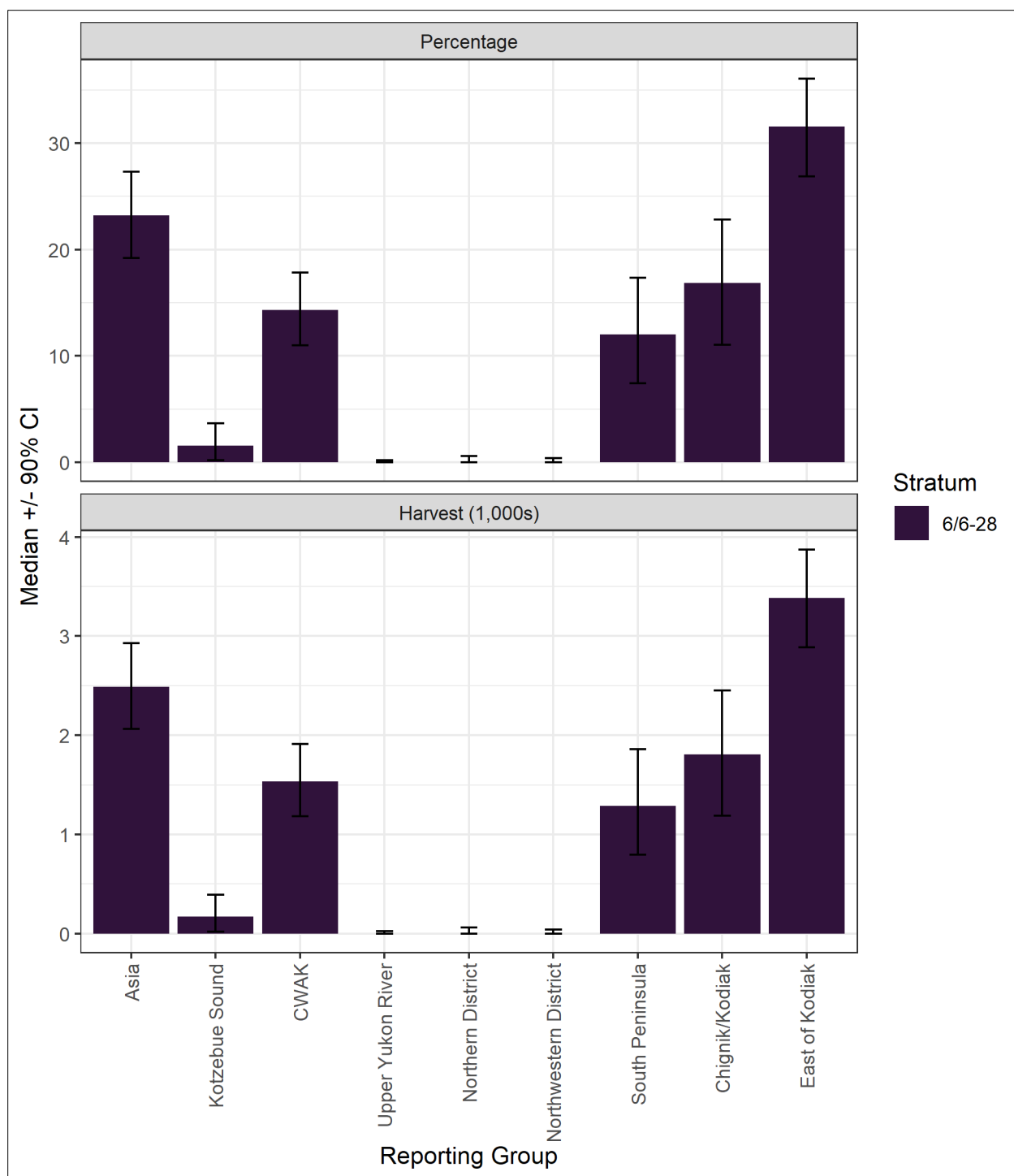


Figure 8.—Median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from the gillnet fishery in the Southeastern and South Central Districts in June 2022.

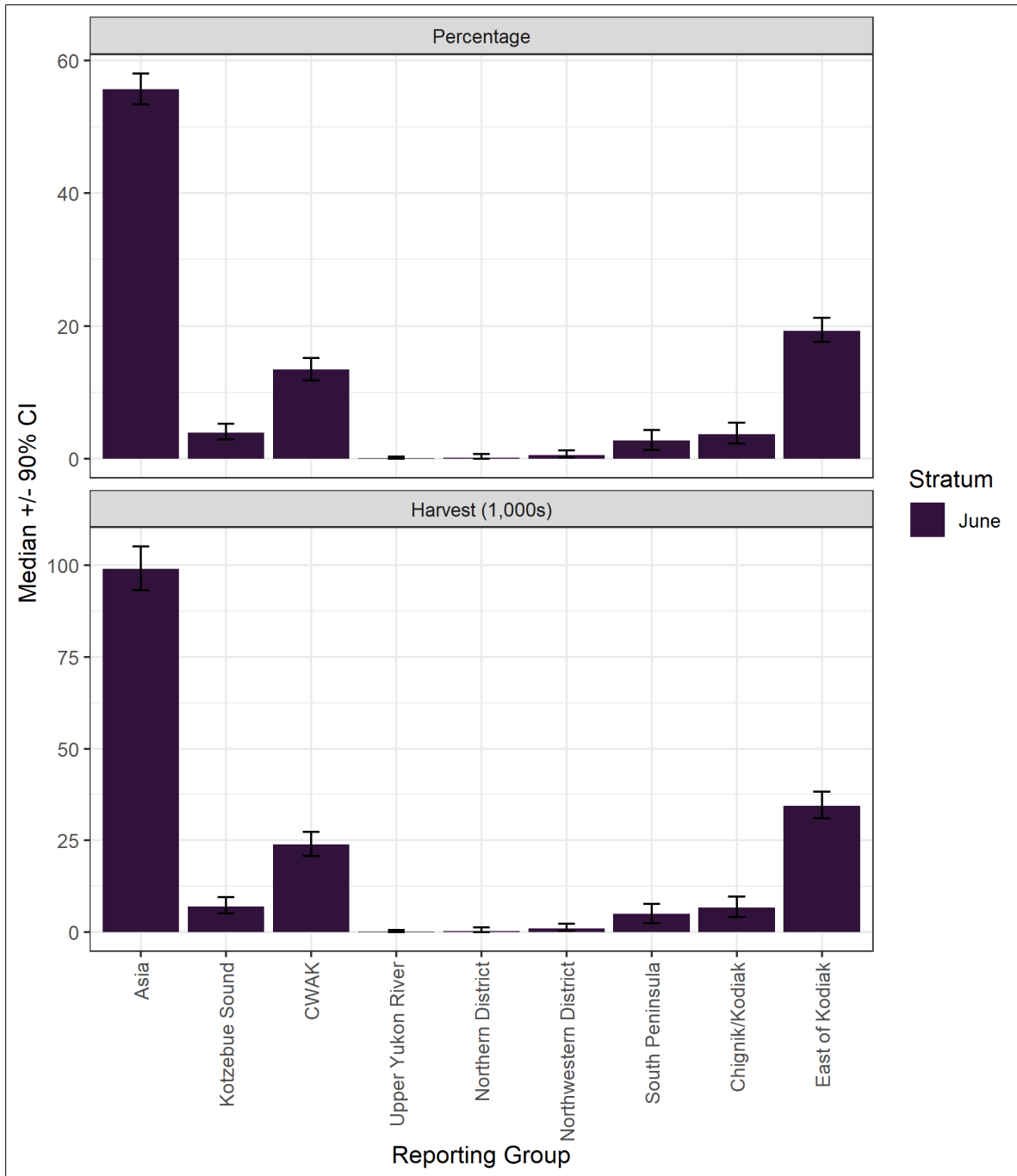


Figure 9.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from fisheries in the Southeastern and South Central Districts in June 2022.

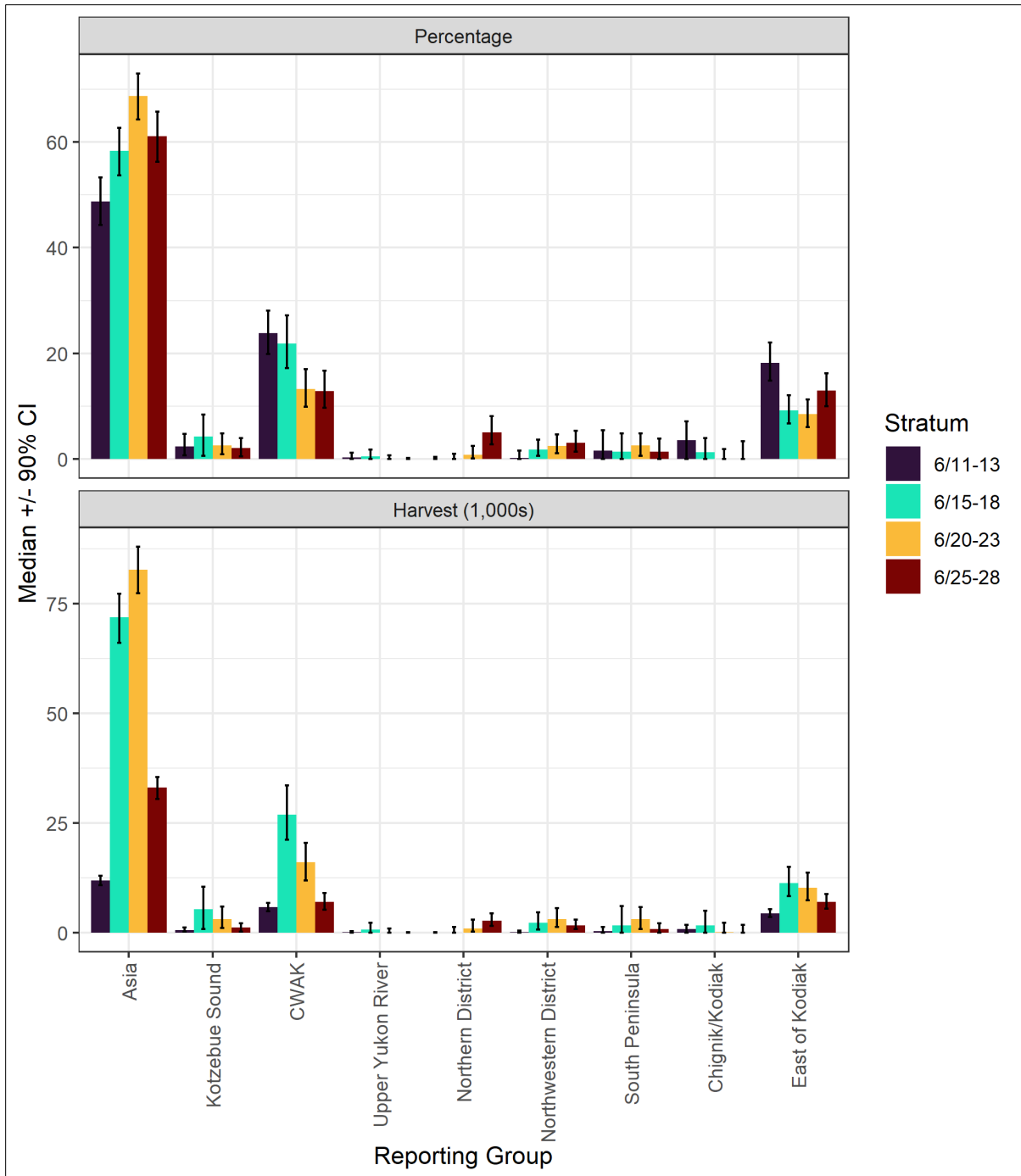


Figure 10.—Median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals by temporal stratum for chum salmon sampled from the seine fishery in the Unimak and Southwestern Districts in June 2022.

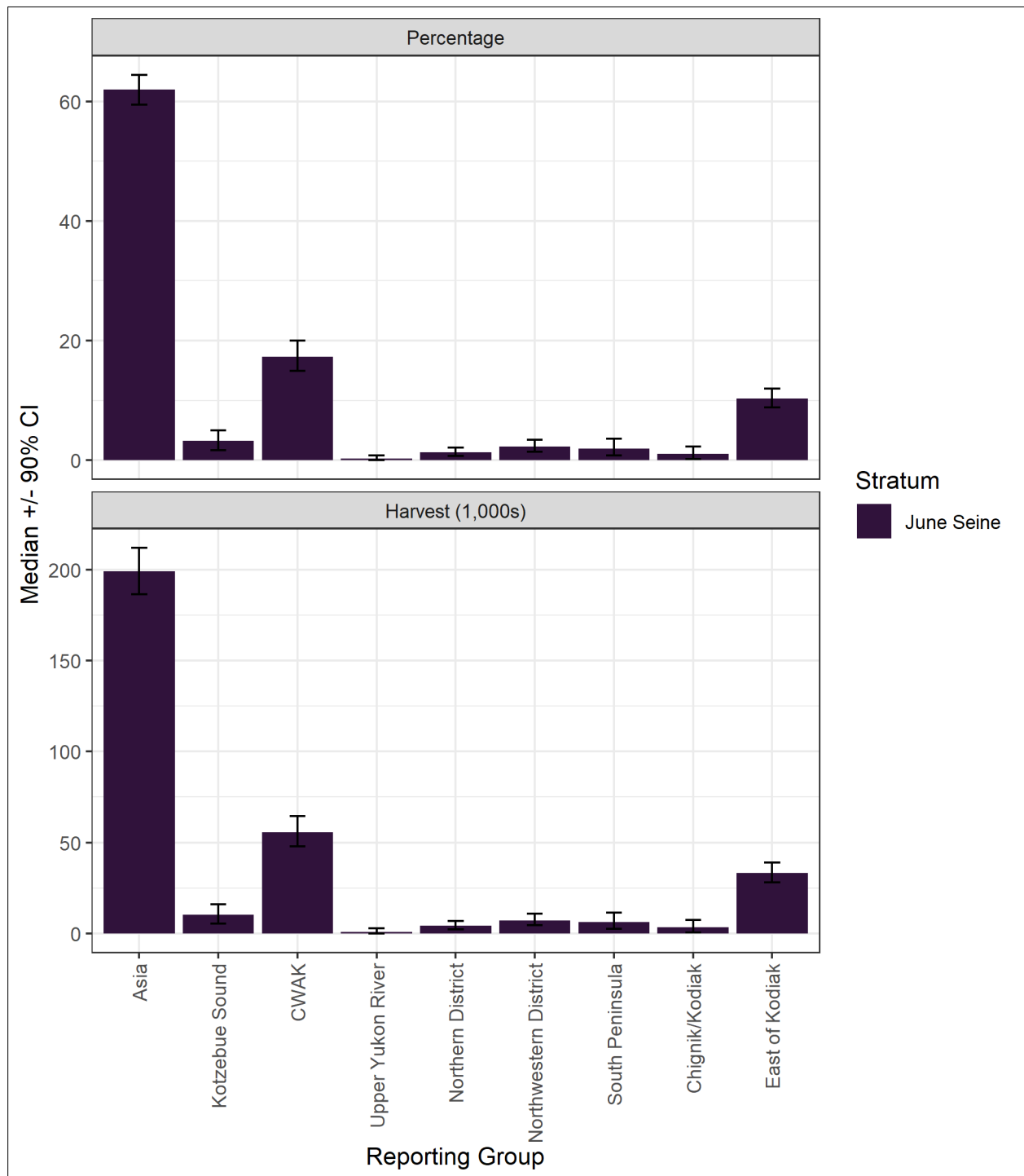


Figure 11.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from the seine fishery in the Unimak and Southwestern Districts in June 2022.

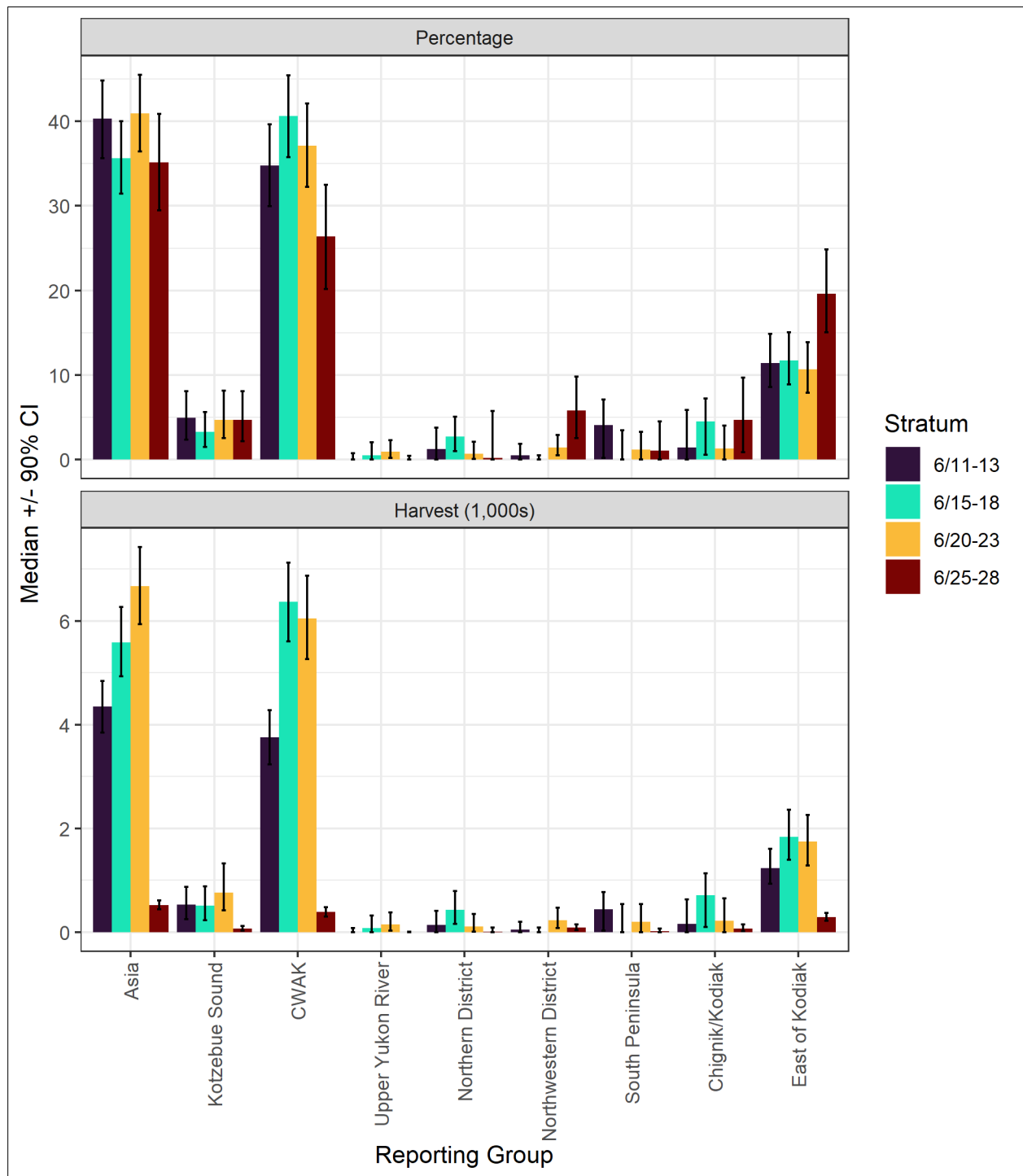


Figure 12.—Median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals by temporal stratum for chum salmon sampled from the gillnet fishery in the Unimak and Southwestern Districts in June 2022.

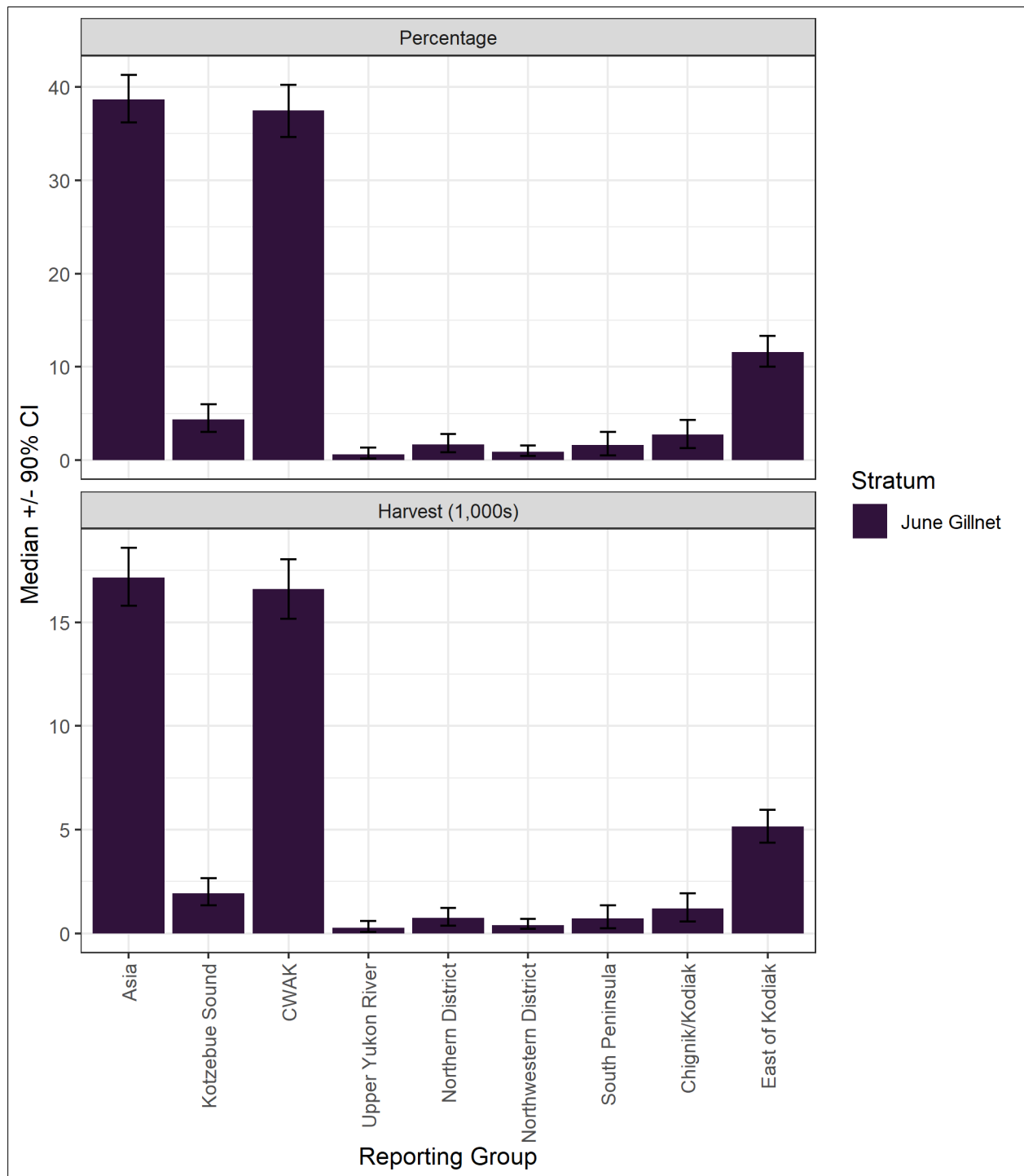


Figure 13.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from the gillnet fishery in the Unimak and Southwestern Districts in June 2022.

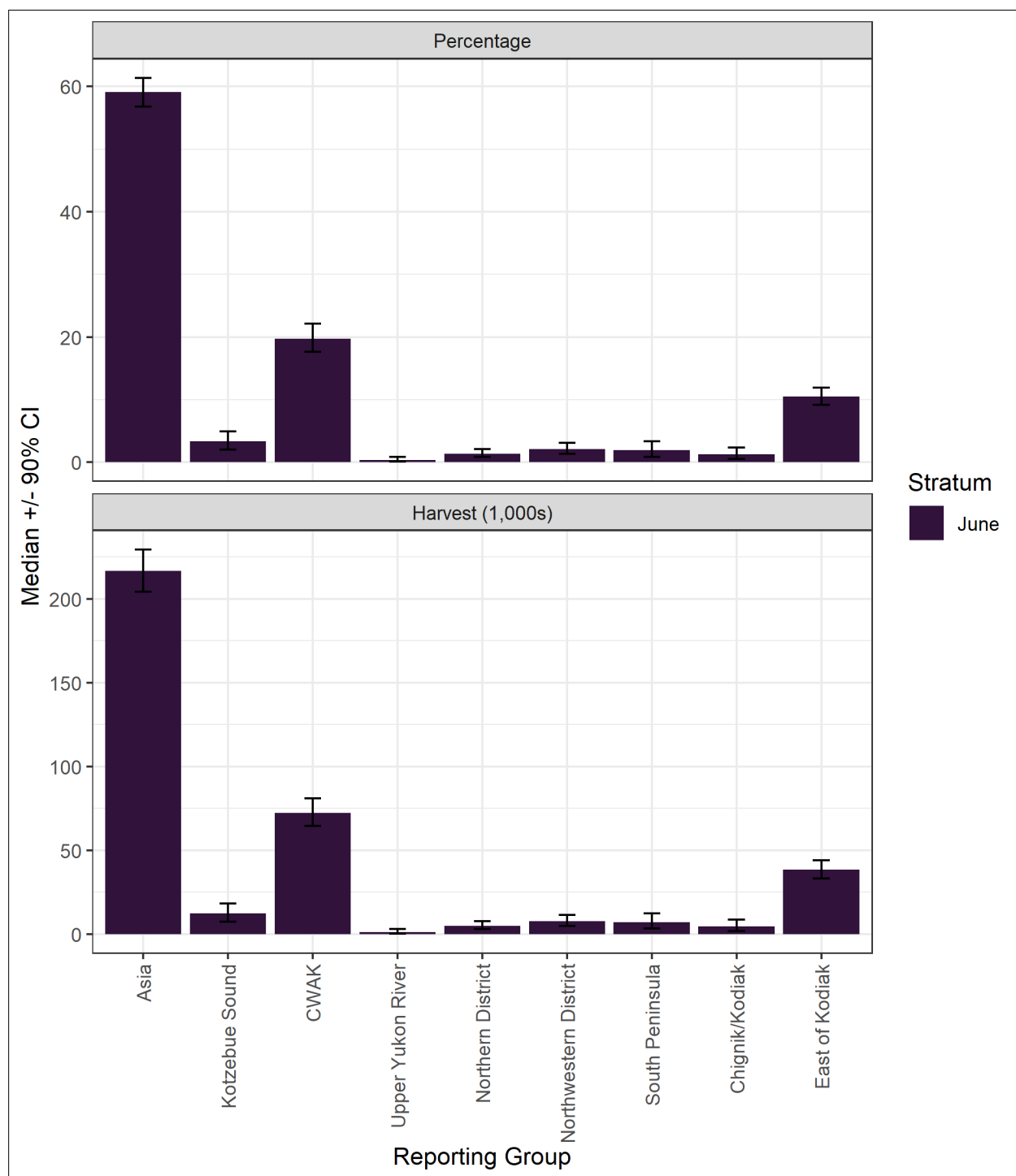


Figure 14.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from fisheries in the Unimak and Southwestern Districts in June 2022.

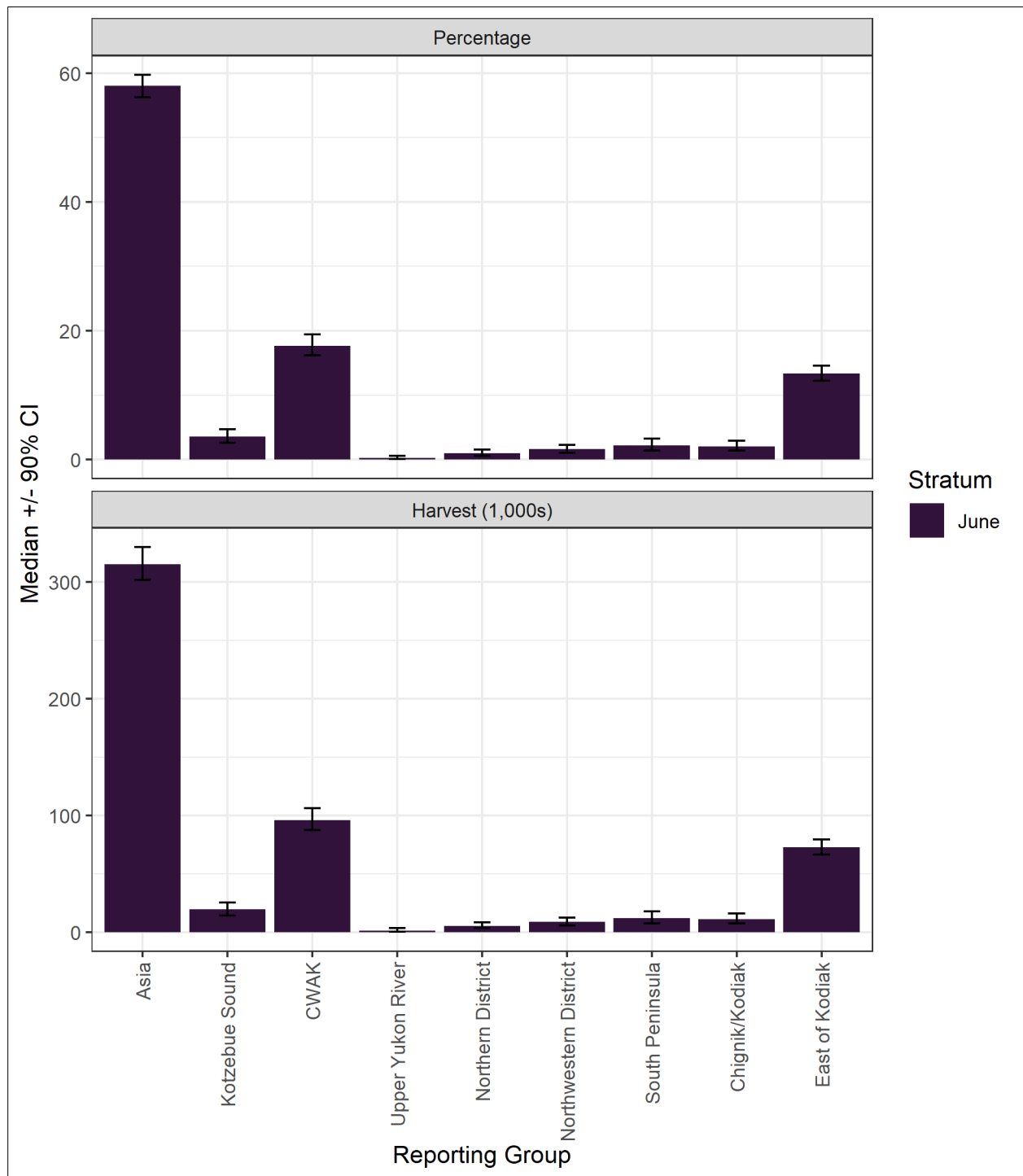


Figure 15.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from fisheries in the South Alaska Peninsula in June 2022.

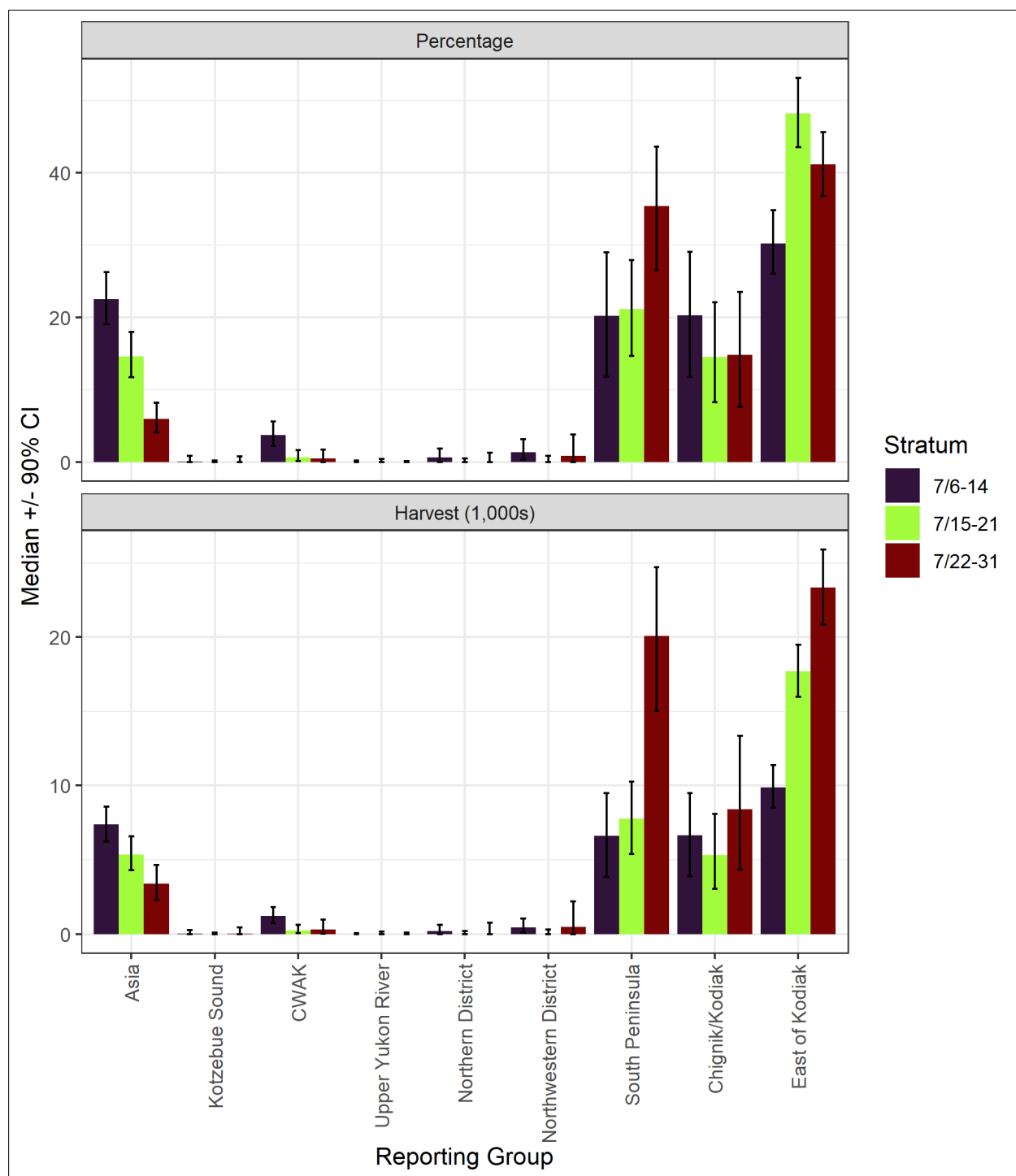


Figure 16.—Median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals by temporal stratum for chum salmon sampled from the seine fishery in the Southeastern and South Central Districts in July 2022.

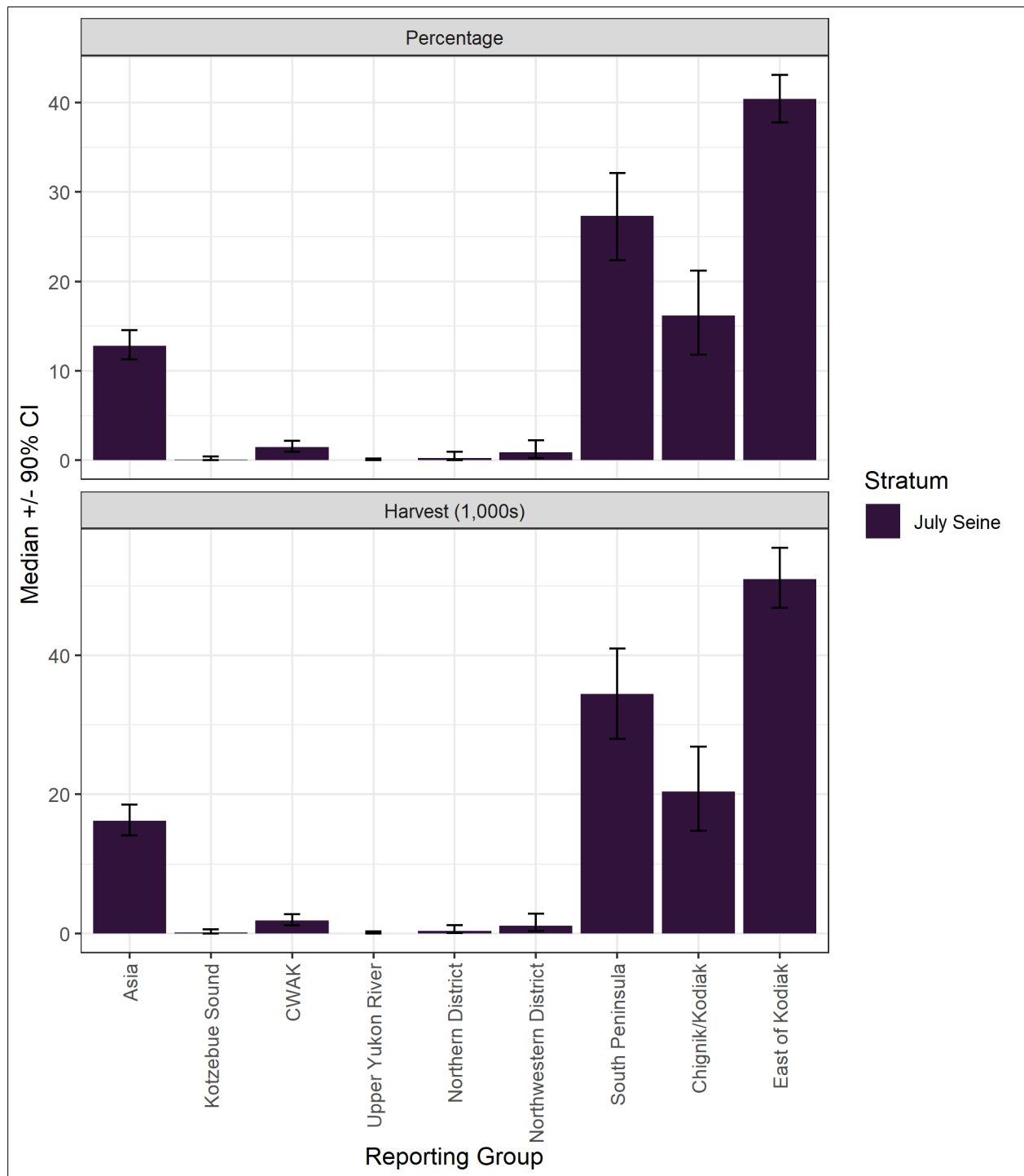


Figure 17.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from the seine fishery in the Southeastern and South Central Districts in July 2022.

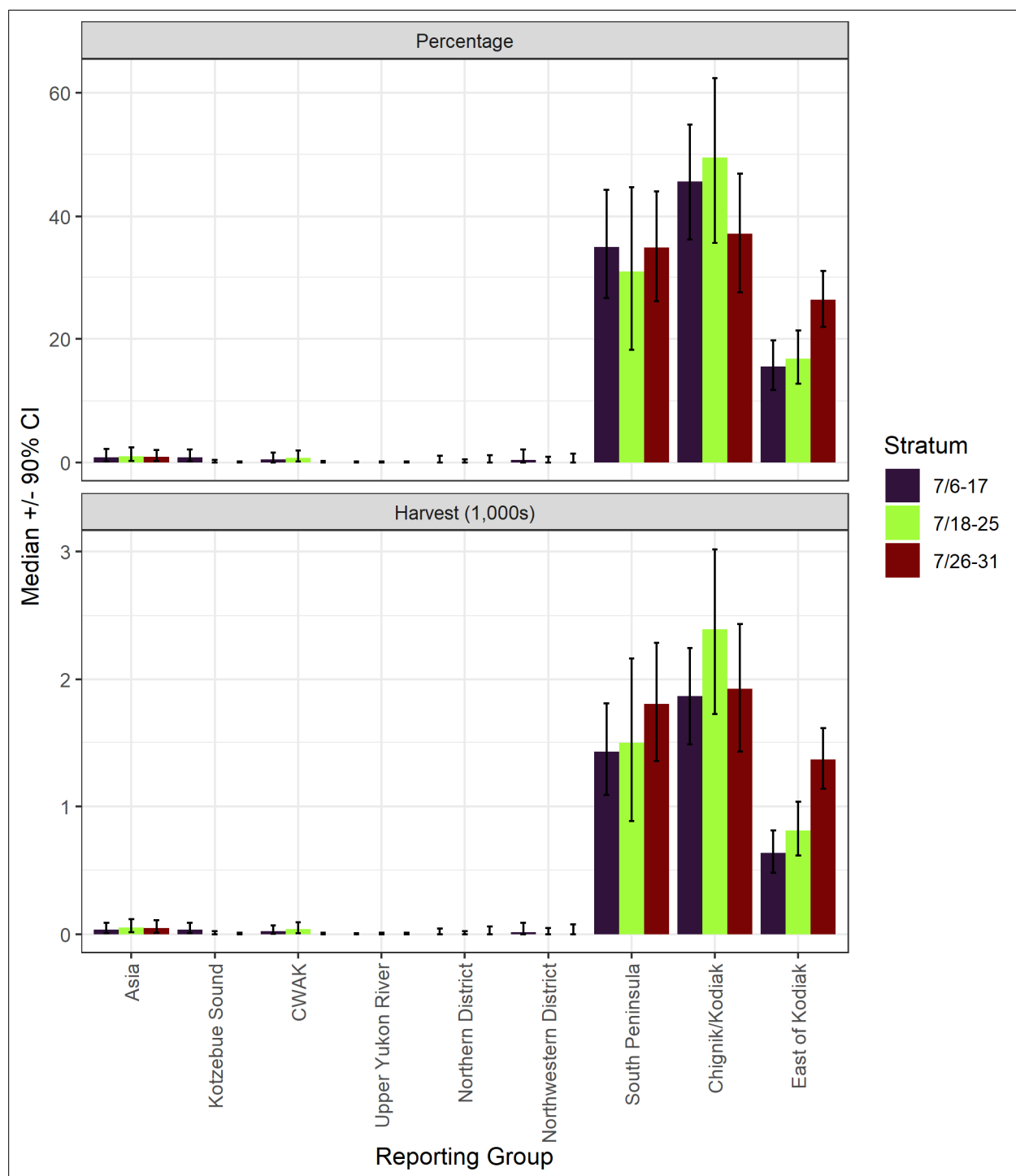


Figure 18.—Median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals by temporal stratum for chum salmon sampled from the gillnet fishery in the Southeastern and South Central Districts in July 2022.

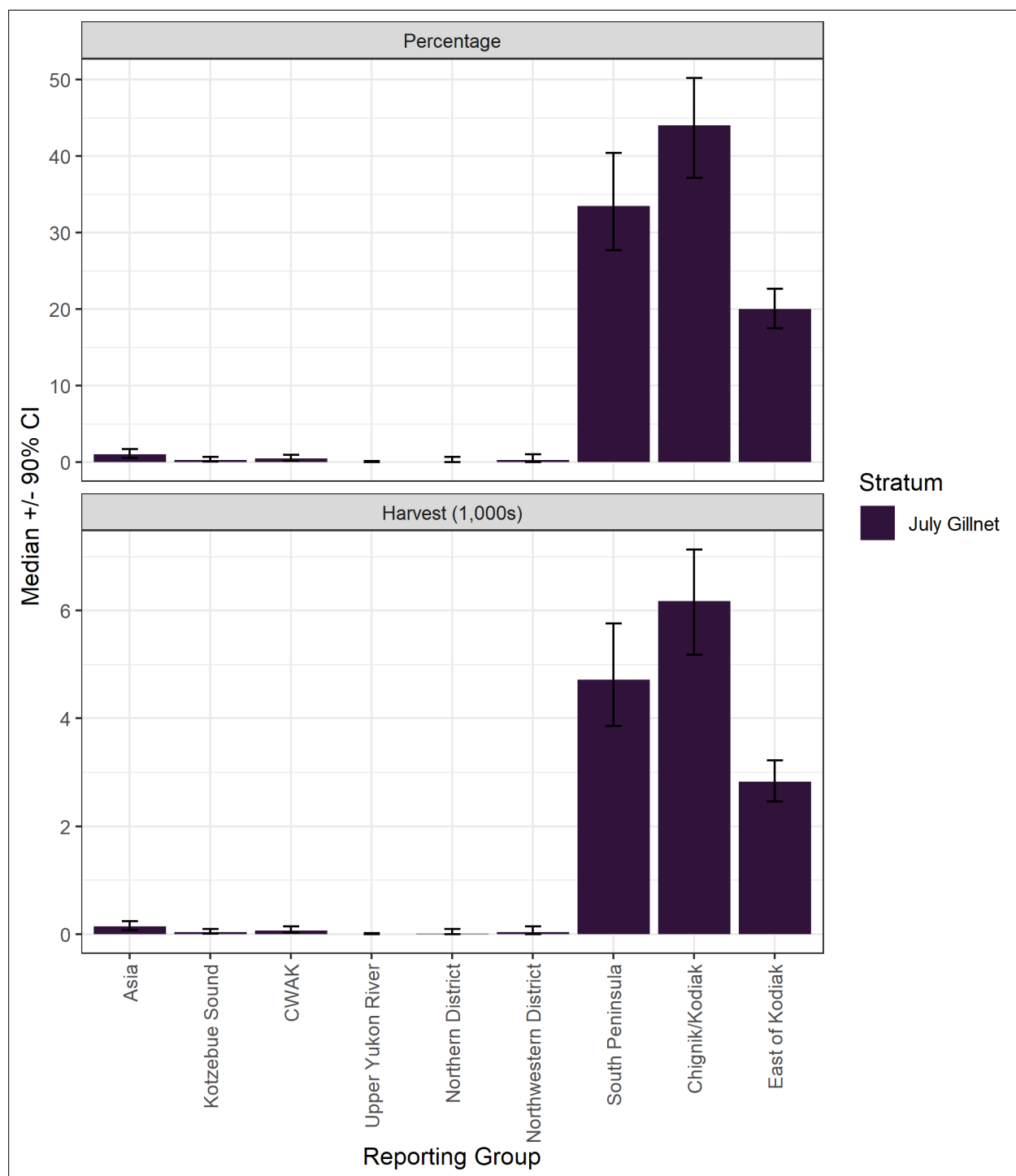


Figure 19.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from the gillnet fishery in the Southeastern and South Central Districts in July 2022.

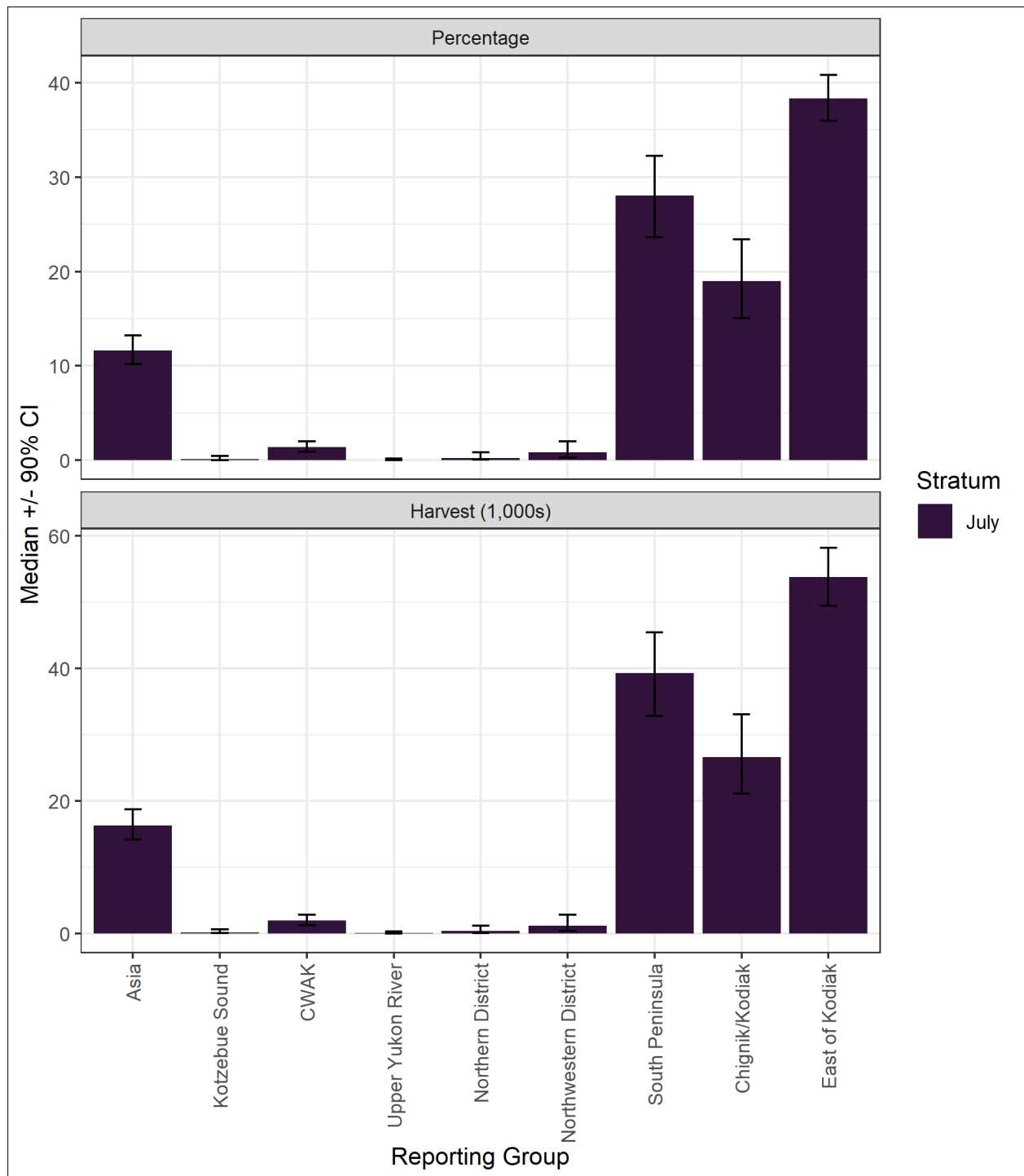


Figure 20.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from fisheries in the Southeastern and South Central Districts in July 2022.

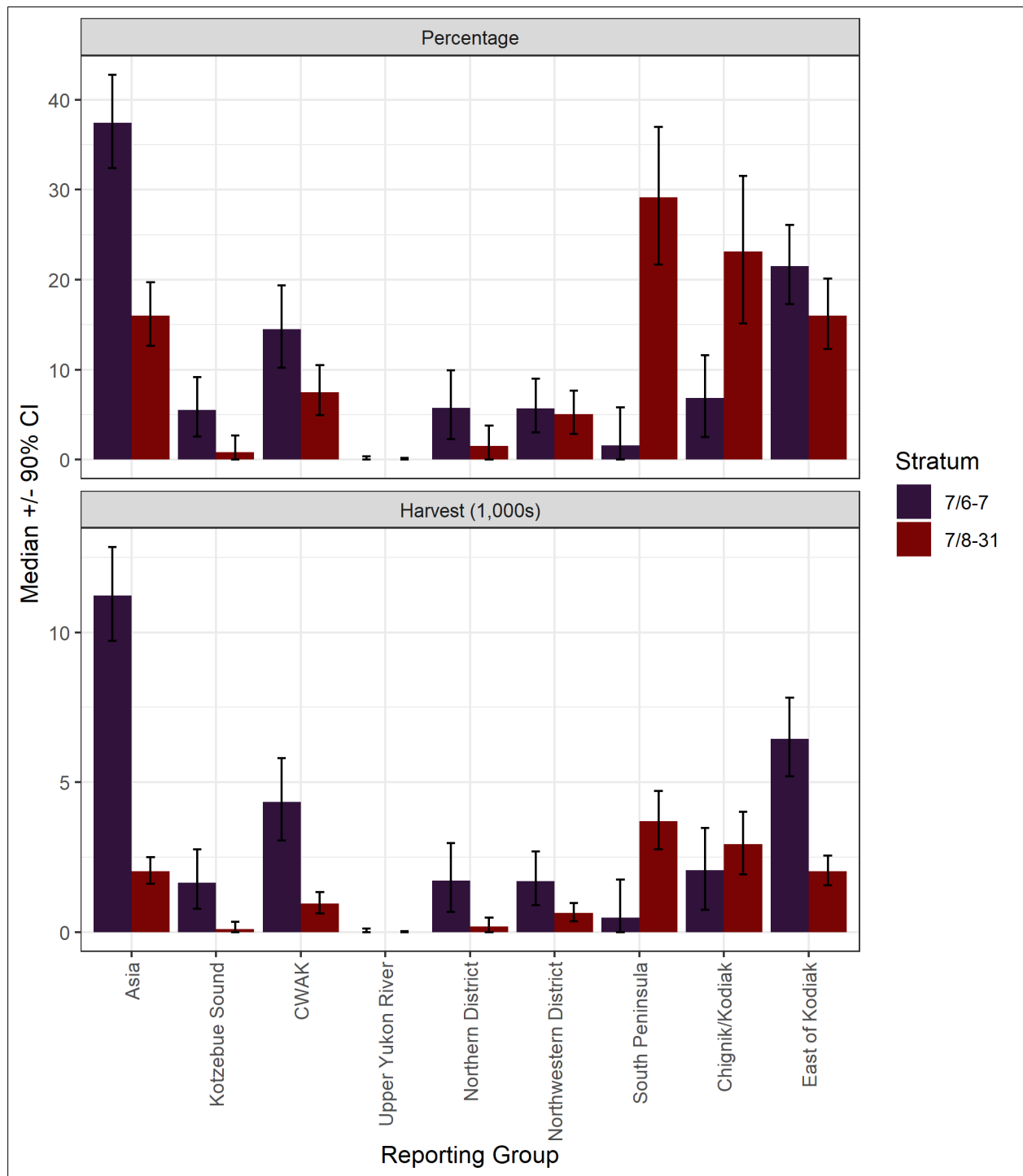


Figure 21.—Median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals by temporal stratum for chum salmon sampled from the seine fishery in the Unimak and Southwestern Districts in July 2022.

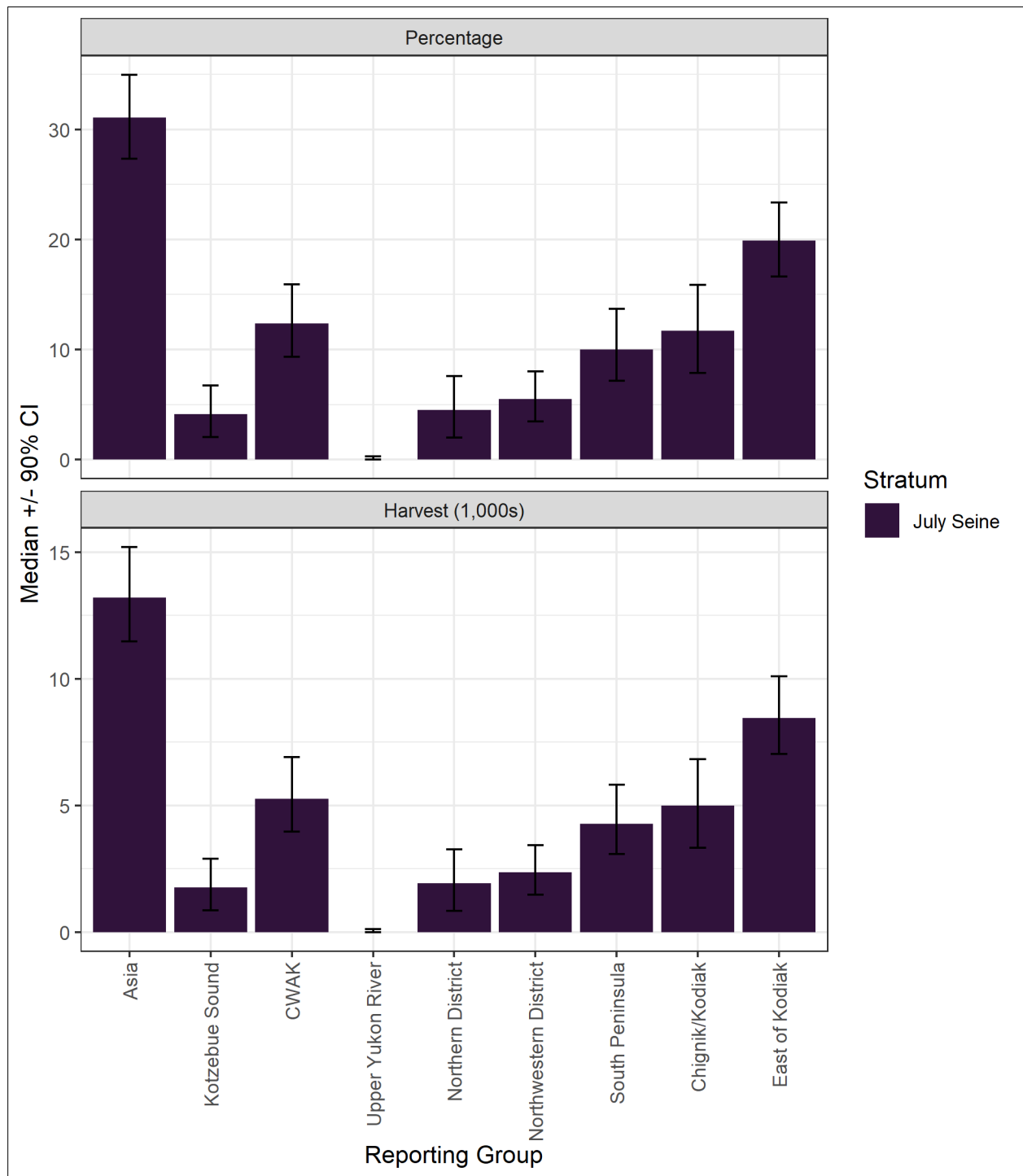


Figure 22.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from the seine fishery in the Unimak and Southwestern Districts in July 2022.

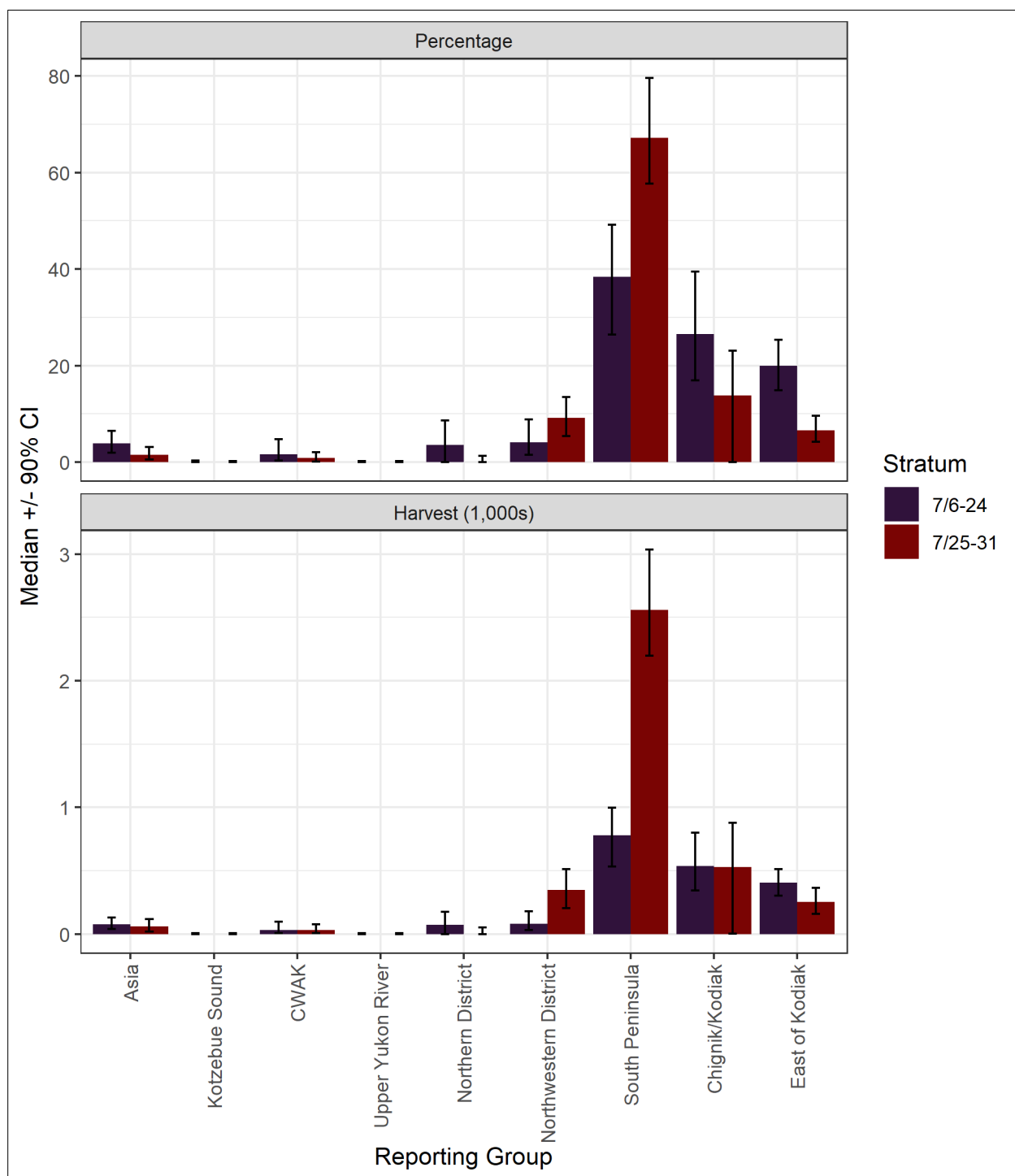


Figure 23.—Median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals by temporal stratum for chum salmon sampled from the gillnet fishery in the Unimak and Southwestern Districts in July 2022.

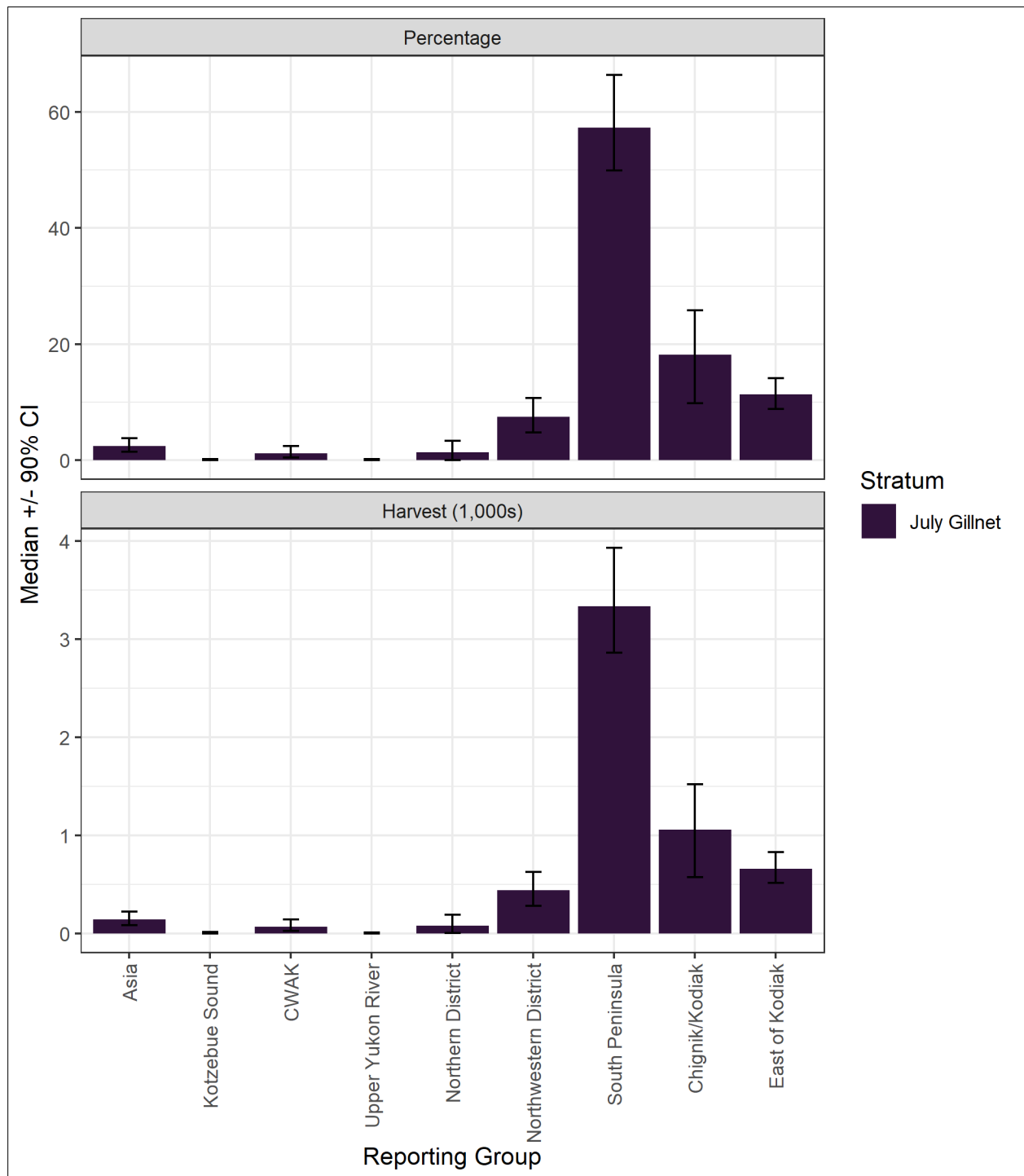


Figure 24.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from the gillnet fishery in the Unimak and Southwestern Districts in July 2022.

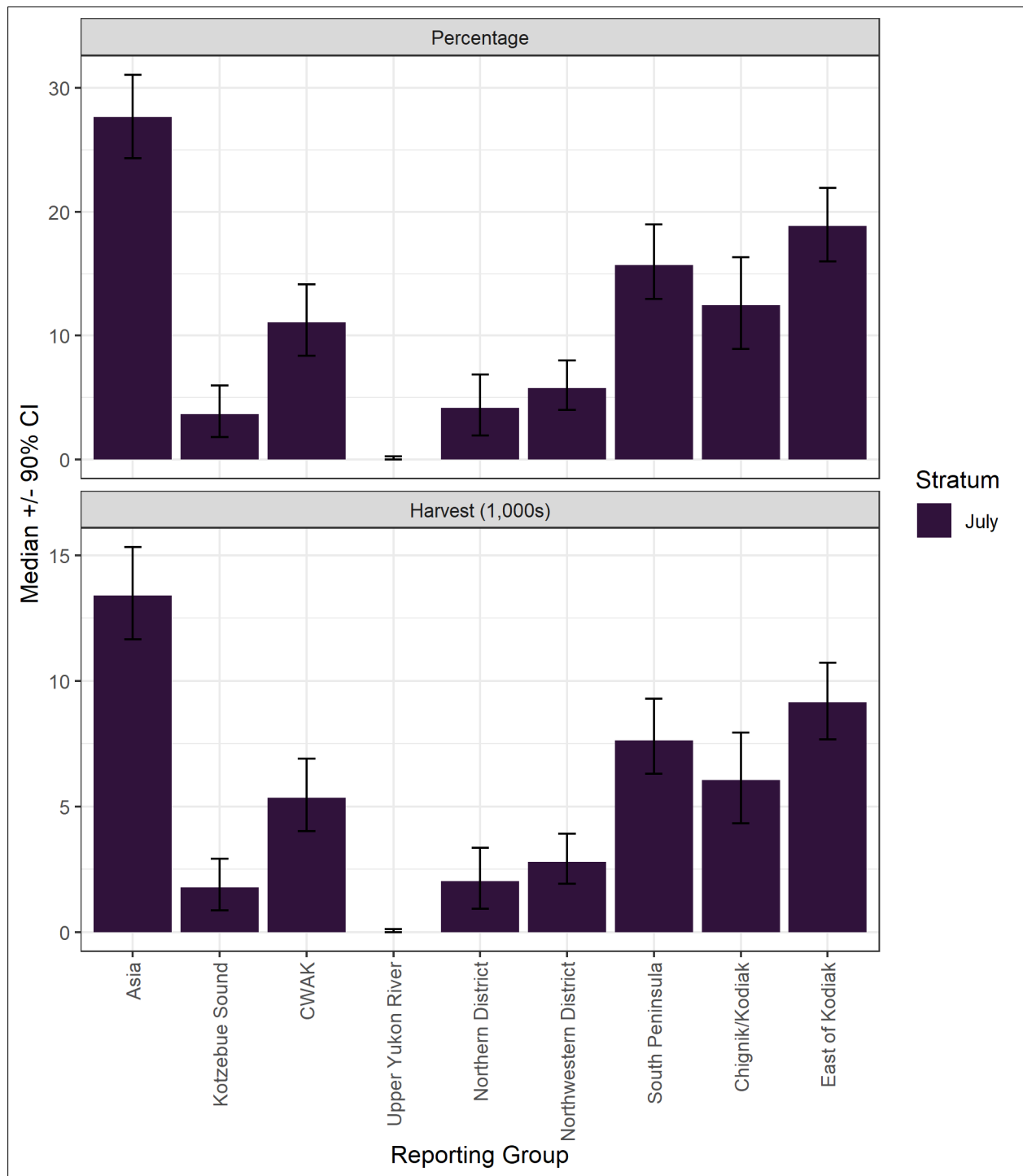


Figure 25.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from fisheries in the Unimak and Southwestern Districts in July 2022.

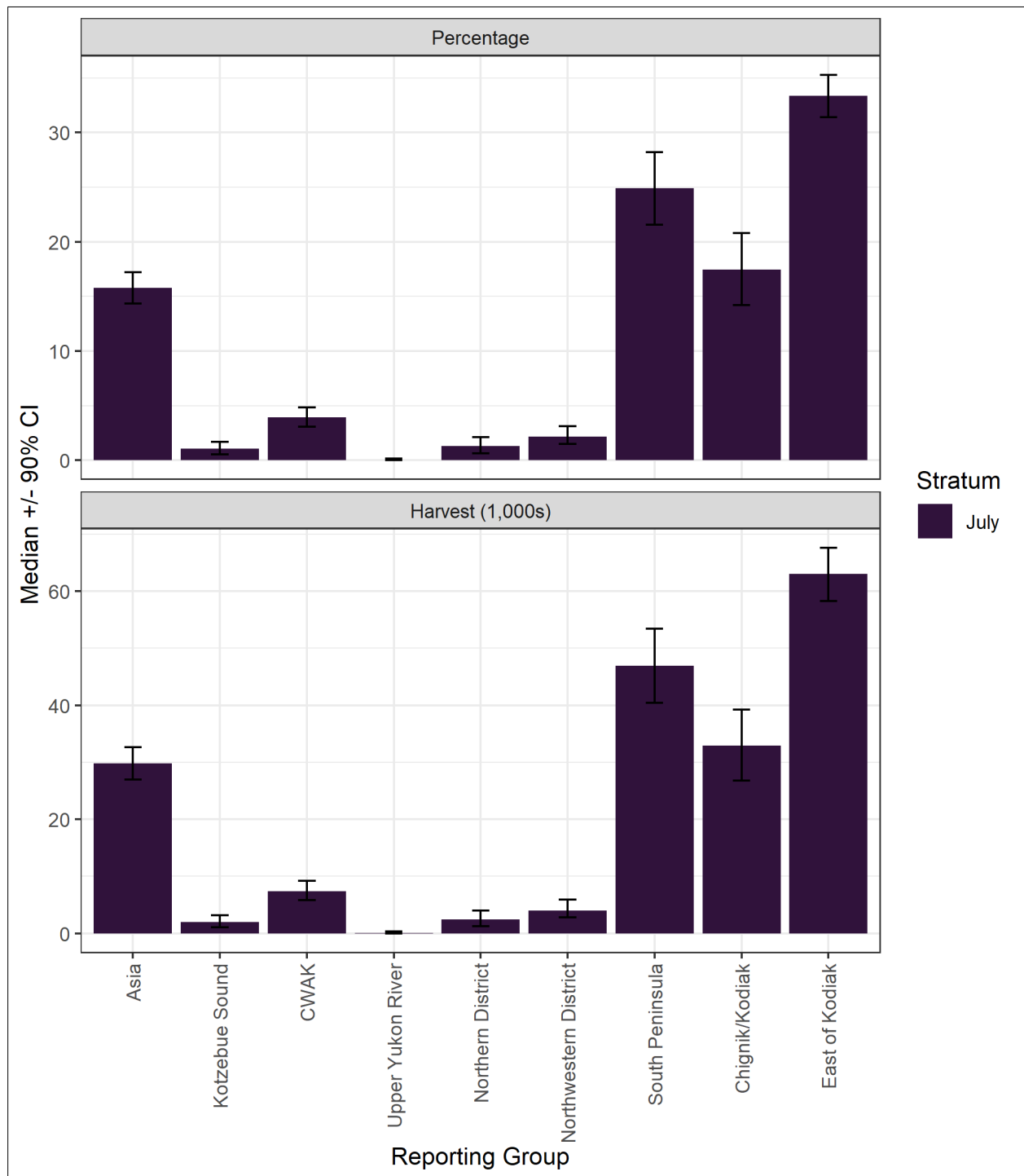


Figure 26.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from fisheries in the South Alaska Peninsula in July 2022.

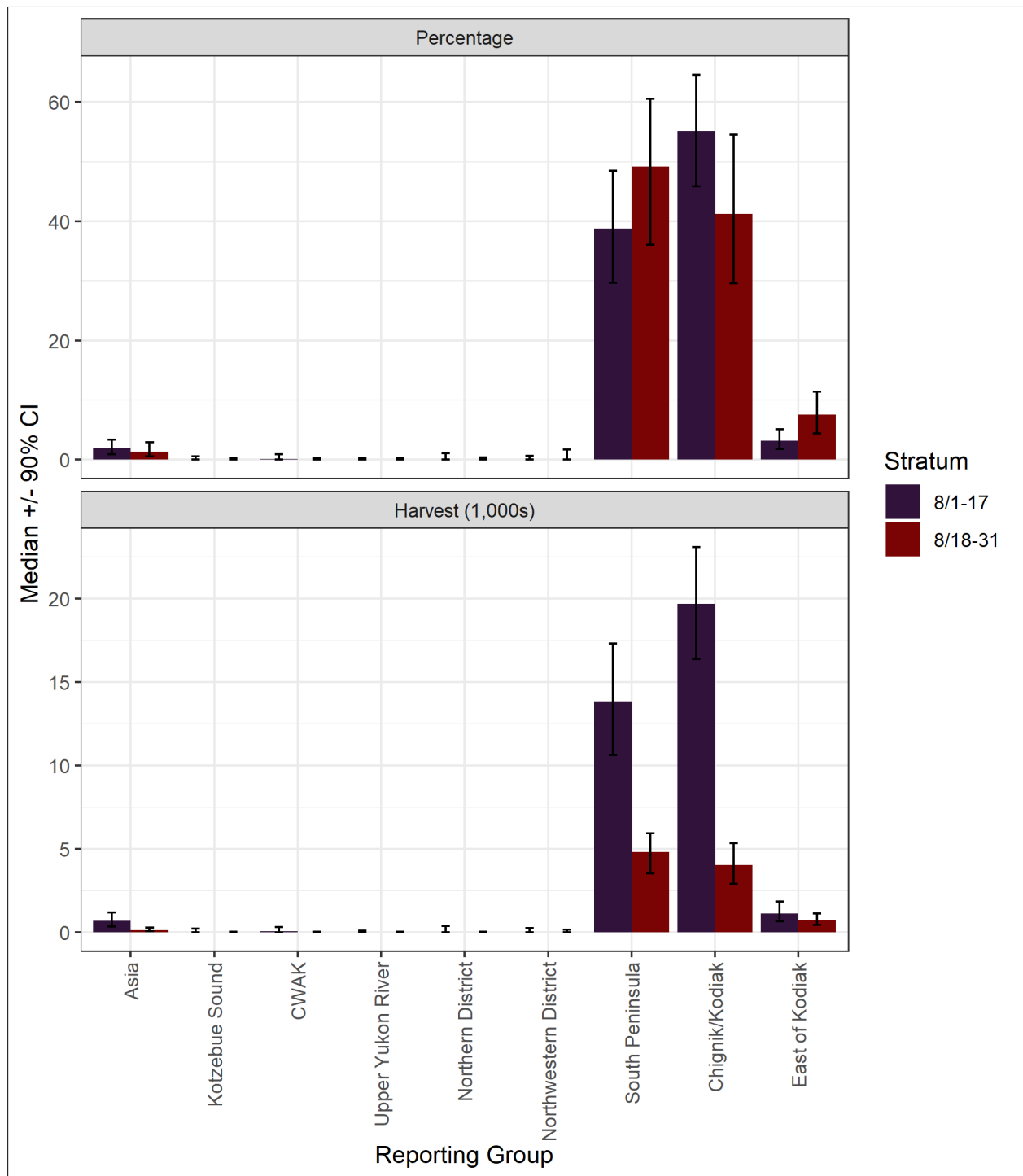


Figure 27.—Median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals by temporal stratum for chum salmon sampled from the seine fishery in the Southeastern and South Central Districts in August 2022.

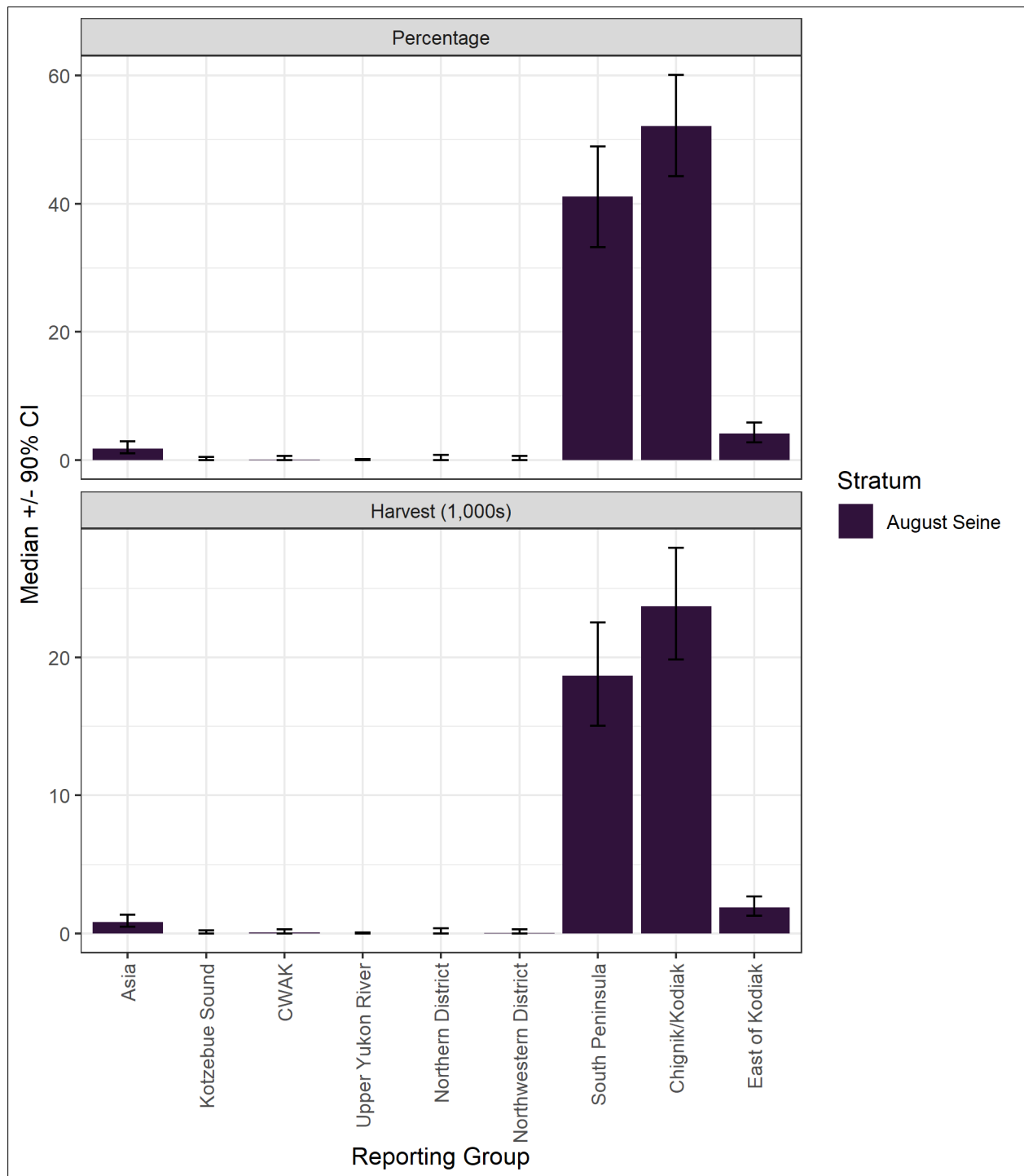


Figure 28.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from the seine fishery in the Southeastern and South Central Districts in August 2022.

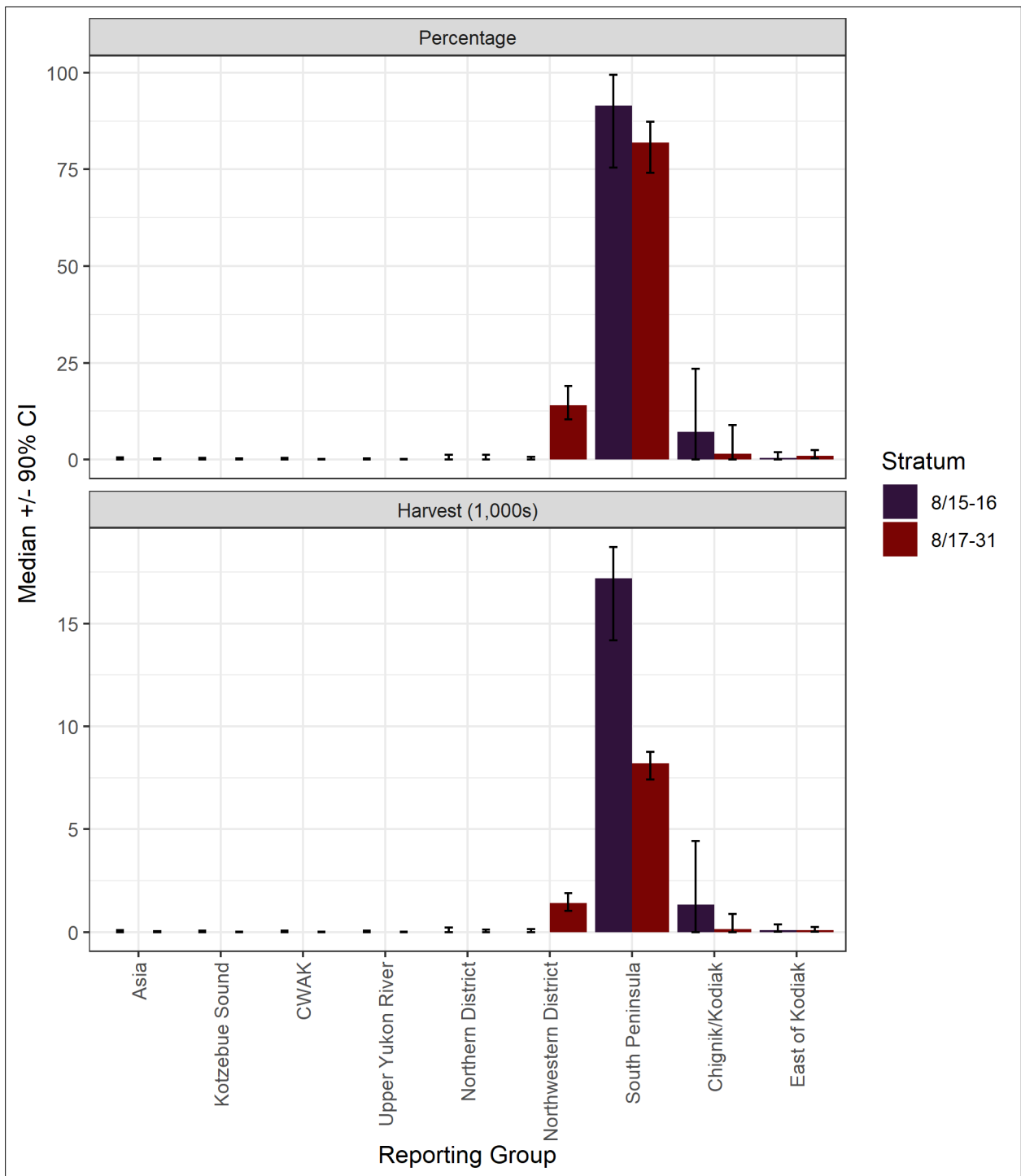


Figure 29.—Median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals by temporal stratum for chum salmon sampled from the seine fishery in the Unimak and Southwestern Districts in August 2022.

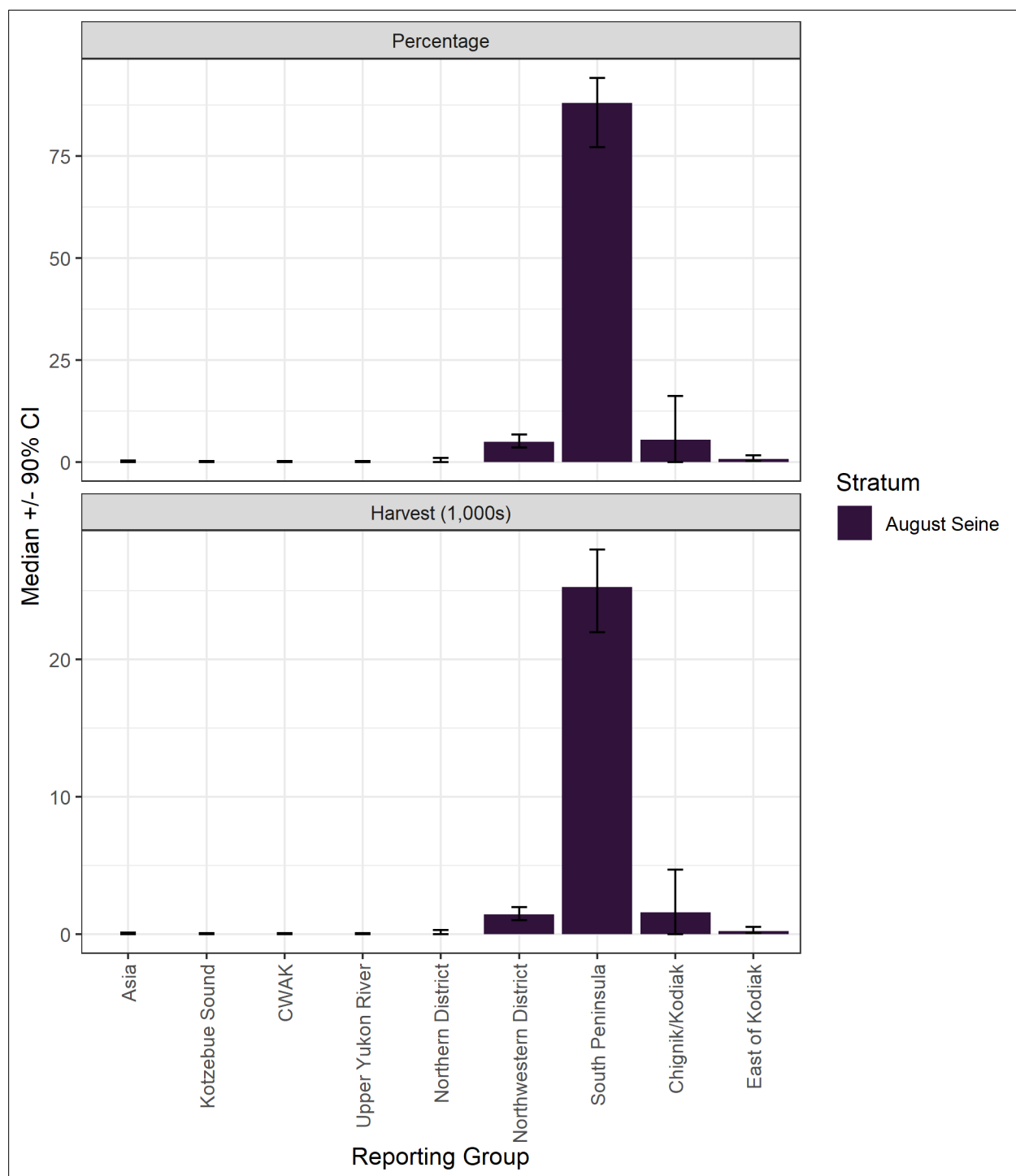


Figure 30.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from the seine fishery in the Unimak and Southwestern Districts in August 2022.

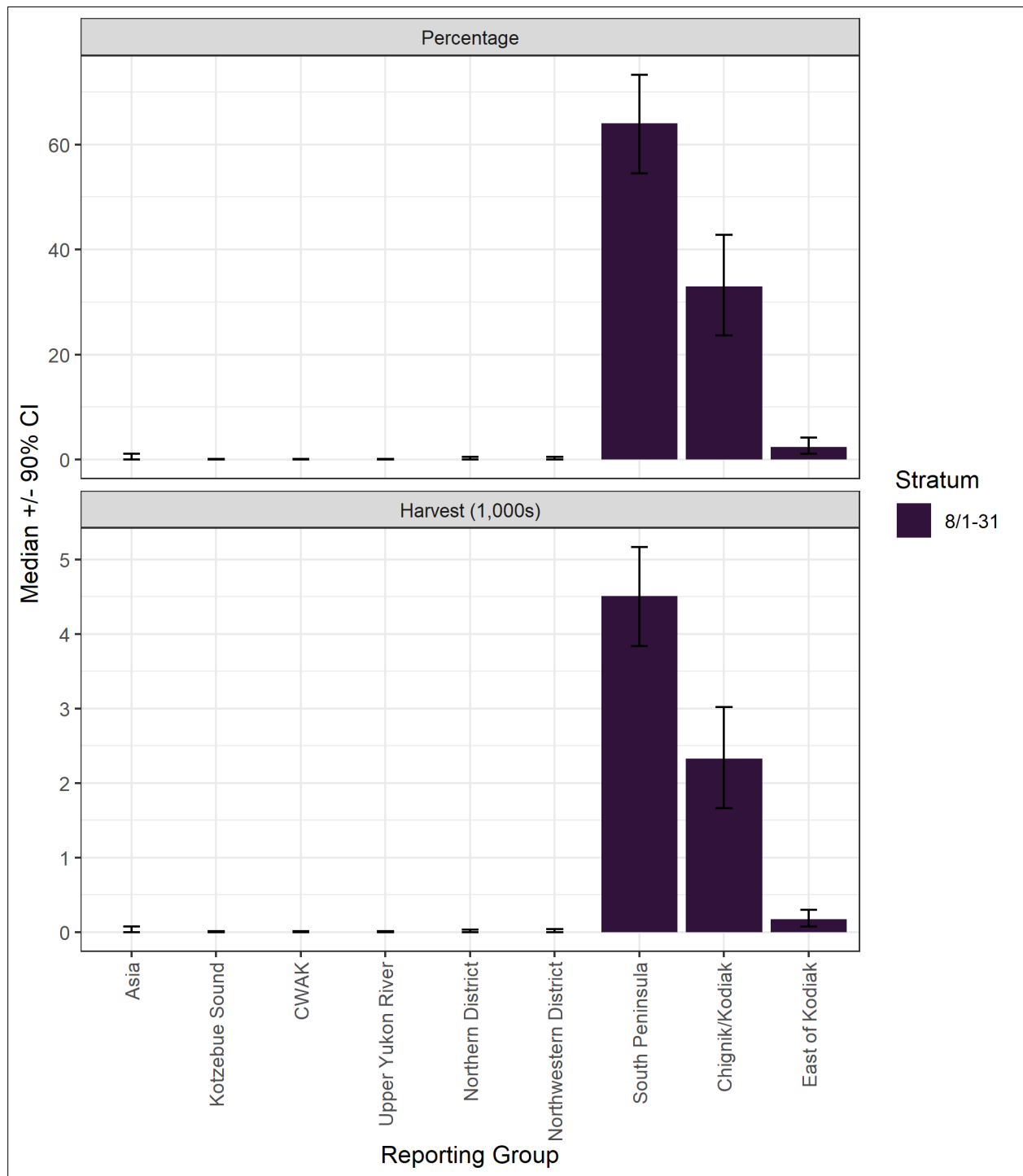


Figure 31.—Estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from the gillnet fishery in the South Alaska Peninsula in August 2022.

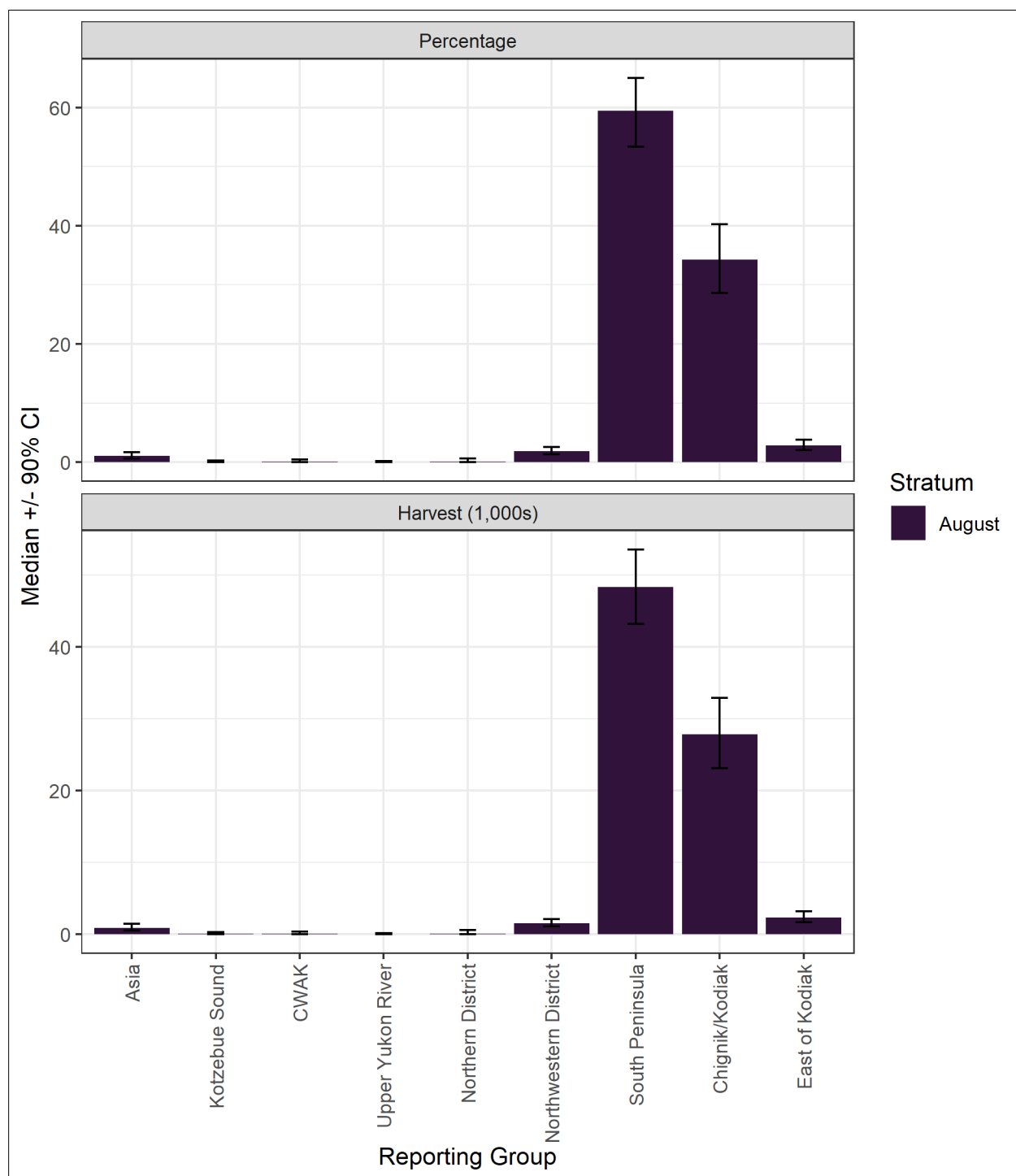


Figure 32.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from fisheries in the South Alaska Peninsula in August 2022.

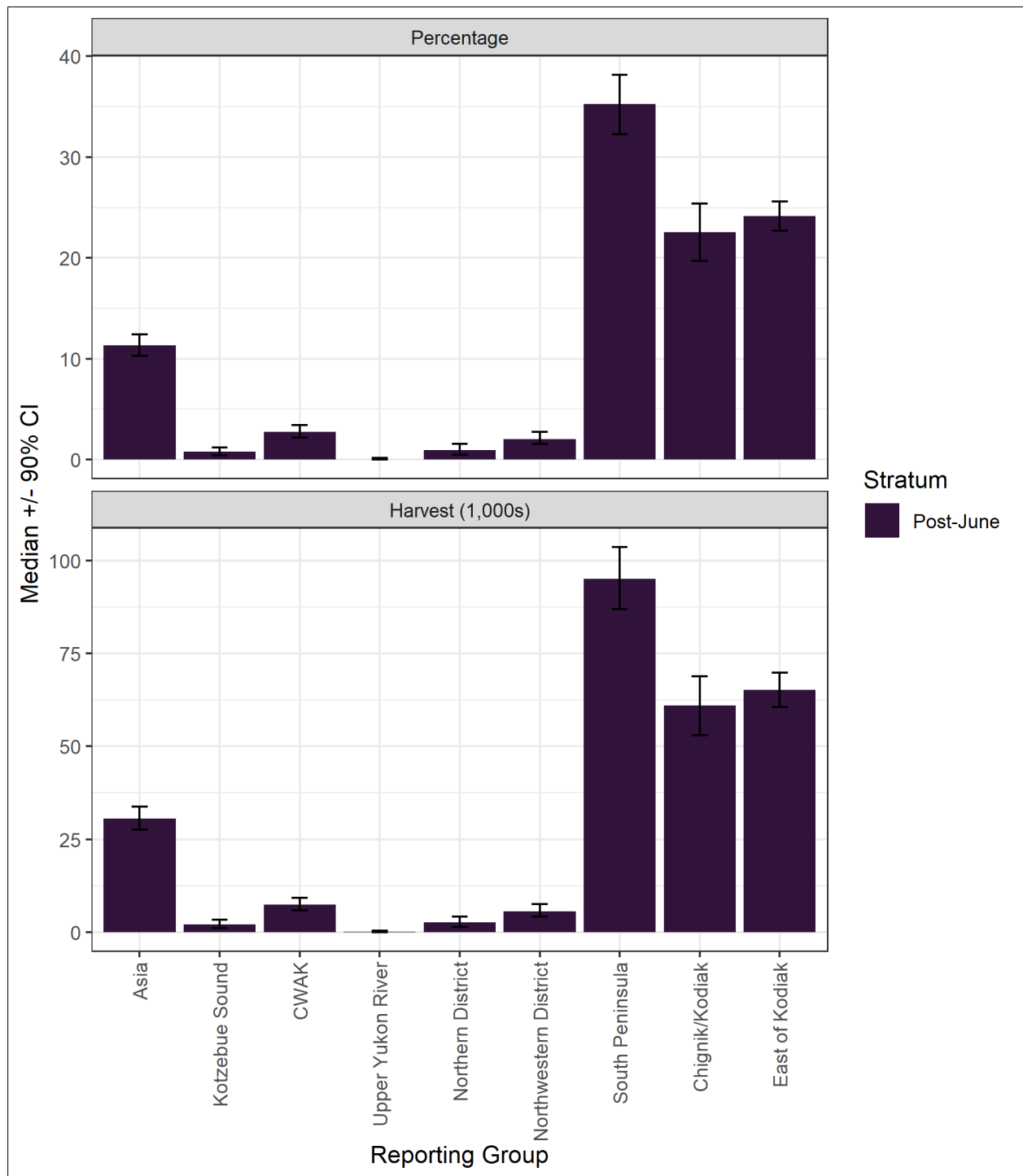


Figure 33.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from fisheries in the South Alaska Peninsula in post-June 2022.

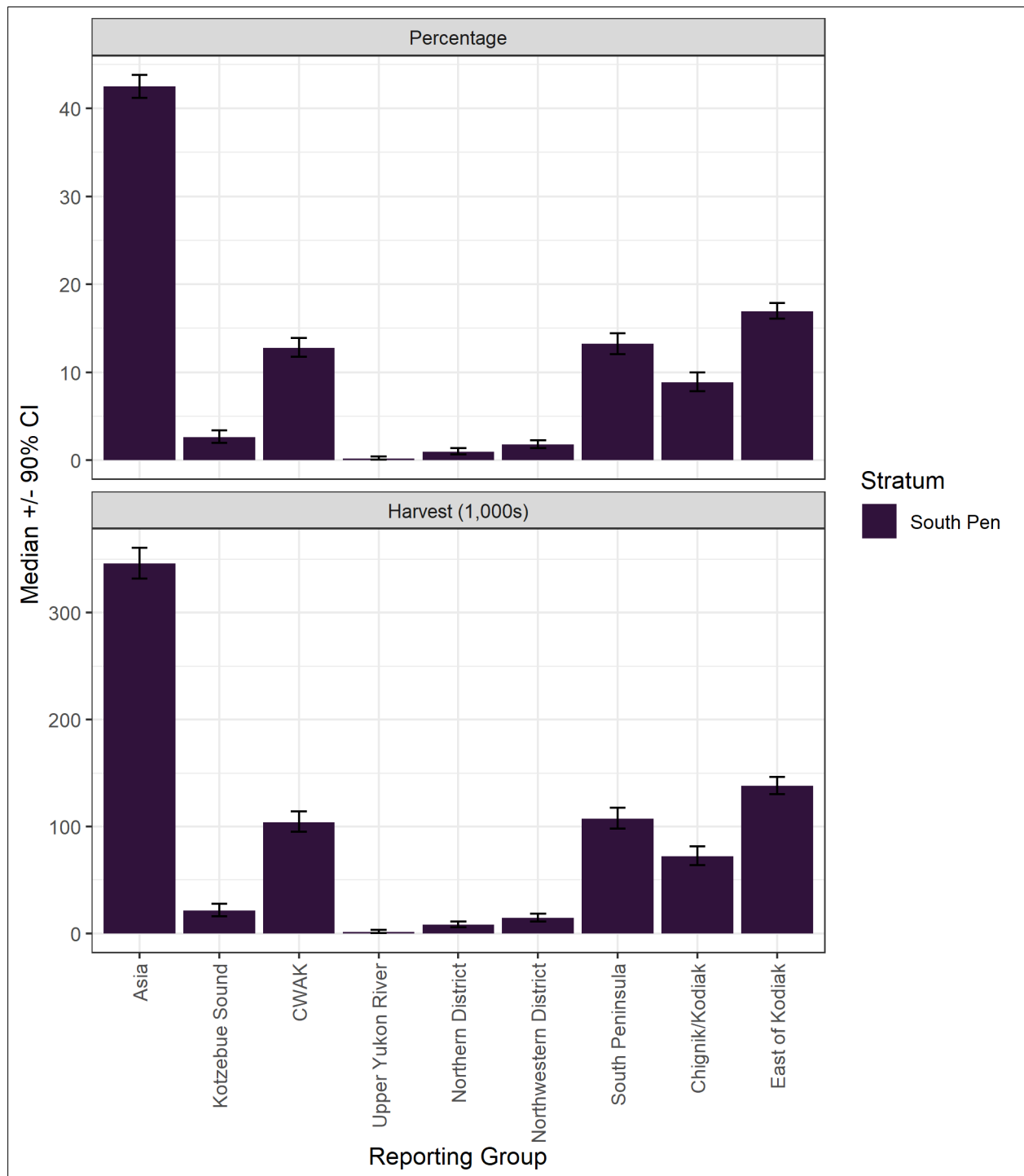


Figure 34.—Stratified estimates of median reporting group stock composition (percentage, top panel) and stock-specific harvest (thousands of fish, bottom panel) and 90% credibility intervals for chum salmon sampled from fisheries in the South Alaska Peninsula in 2022.

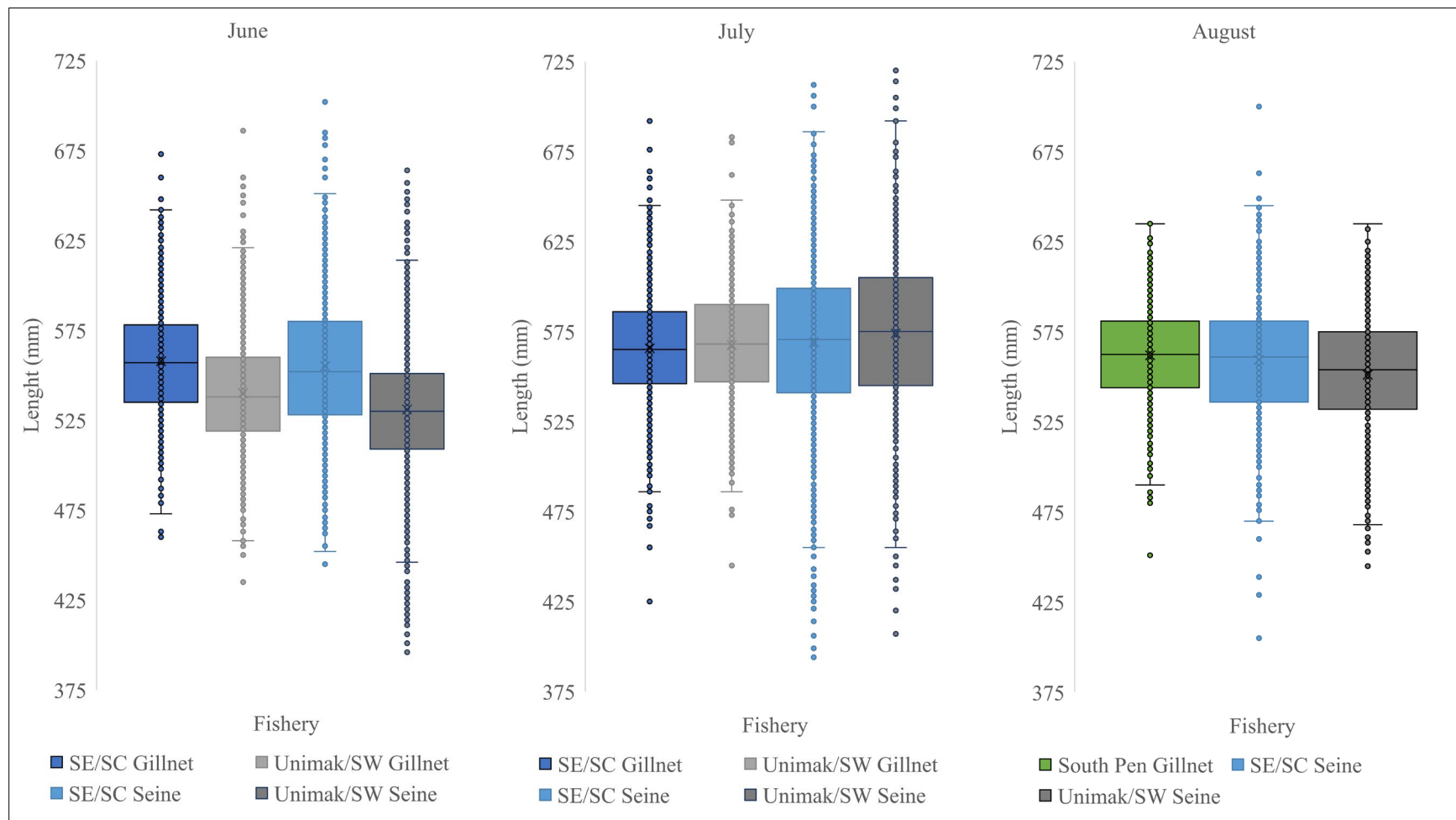


Figure 35.—South Alaska Peninsula area, all strata ($n = 14,869$). Box plots showing mean, median, percentiles and range of size (mm) of chum salmon genetic samples by fishery and gear type, June through August 2022.

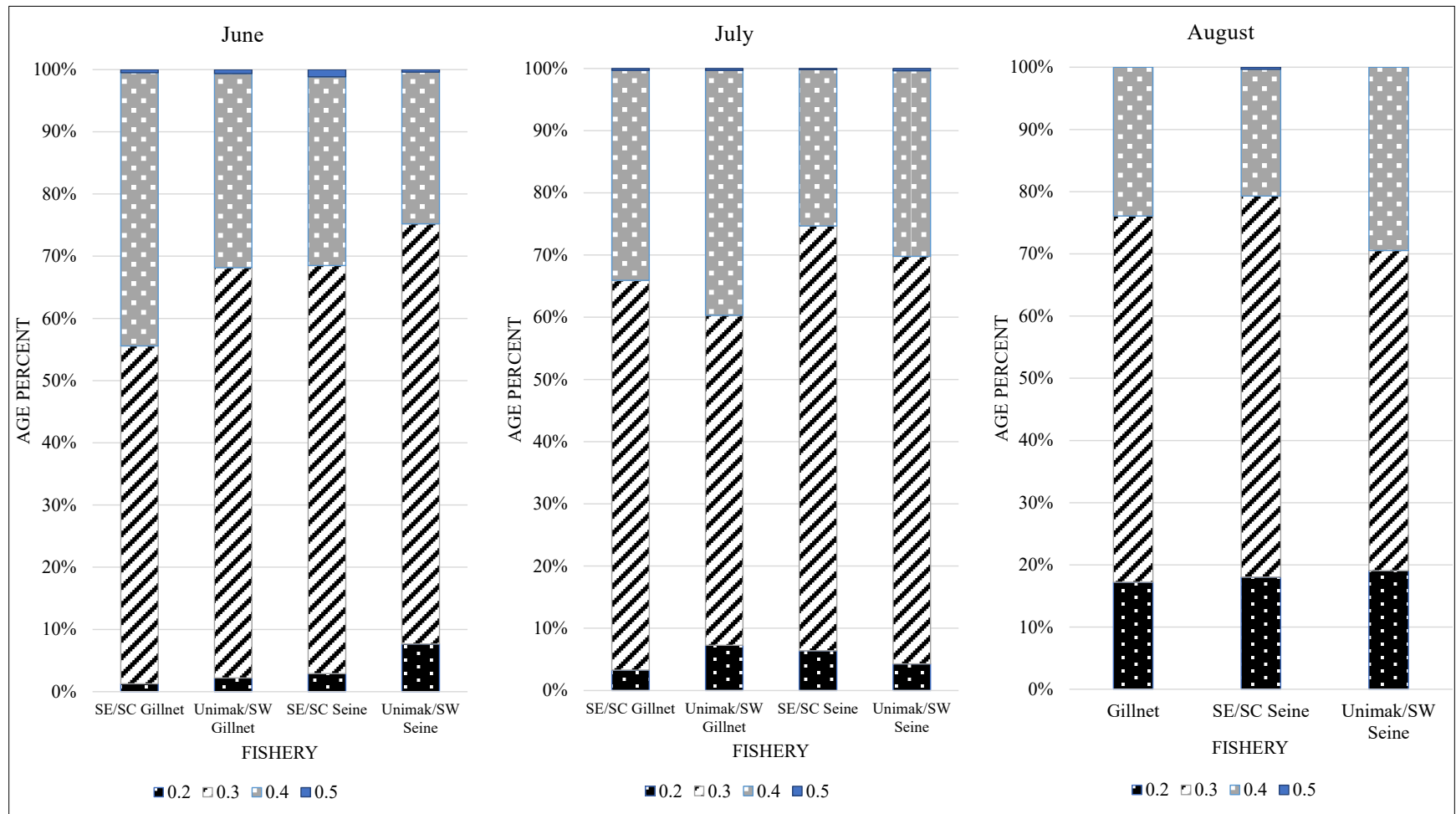


Figure 36.—South Alaska Peninsula area, all strata ($n = 14,869$). Bar graphs showing age composition of chum salmon genetic samples by fishery and gear type, June through August 2022.

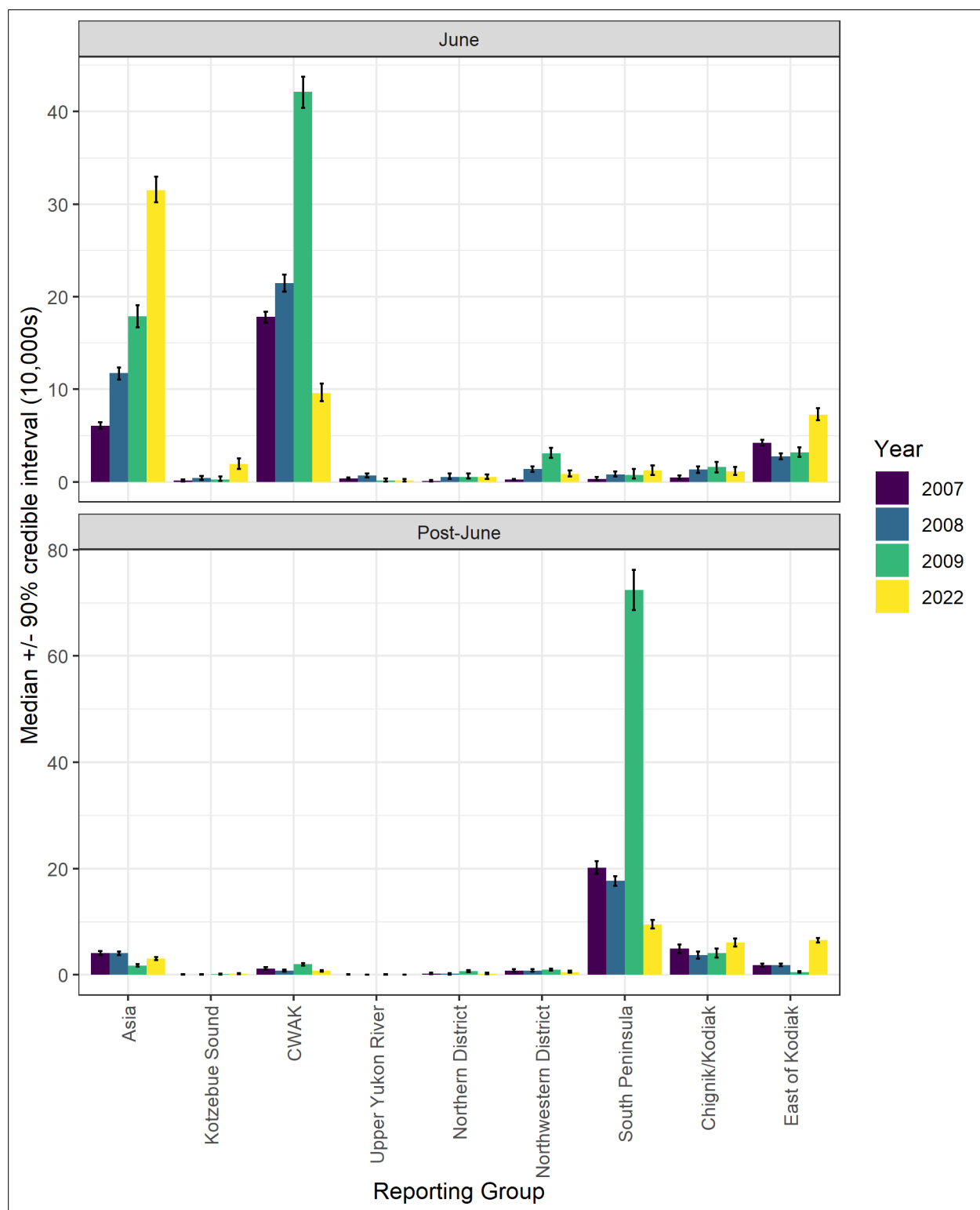


Figure 37.—Stratified estimates of median reporting group stock-specific harvests (10,000s of fish) and 90% credibility intervals for chum salmon sampled from the June (top panel) and post-June (bottom panel) fisheries in the South Alaska Peninsula in 2007, 2008, 2009, and 2022.

APPENDIX A: SAMPLING RESULTS

Appendix A1.–Unimak and Southwestern Districts, South Alaska Peninsula area, 2022. Commercial seine fishery tissue sampling by temporal stratum, harvest date(s), sample date(s), statistical area(s), and port location.

Temporal stratum	Harvest date(s)	Sample date(s)	Stat area(s)	Number of samples	Port location
June 1	6/11/2022	6/12/2022	284-90	222	False Pass
June 1	6/11/2022–6/12/2022	6/13/2022	285-20, 285-30, 284-90, 285-40	40	False Pass
June 1	6/12/2022	6/13/2022	284-90	160	False Pass
June 1	6/13/2022	6/14/2022	284-90	160	False Pass
June 2	6/15/2022	6/16/2022	285-40	160	False Pass
June 2	6/16/2022	6/18/2022	285-40	160	False Pass
June 2	6/17/2022	6/19/2022	285-40	160	False Pass
June 2	6/18/2022	6/20/2022	285-30	160	False Pass
June 3	6/20/2022	6/22/2022	284-90, 285-40	200	False Pass
June 3	6/21/2022	6/22/2022	284-90, 285-40	39	False Pass
June 3	6/21/2022–6/22/2022	6/22/2022	285-40	120	False Pass
June 3	6/22/2022	6/23/2022	284-90	160	False Pass
June 3	6/23/2022	6/24/2022	284-90	160	False Pass
June 4	6/25/2022	6/26/2022	285-40	200	False Pass
June 4	6/25/2022–6/27/2022	6/28/2022	285-40	80	False Pass
June 4	6/26/2022	6/27/2022	284-90	160	False Pass
June 4	6/26/2022	6/27/2022	285-10, 284-90	80	King Cove
June 4	6/27/2022–6/28/2022	6/29/2022	284-90	198	False Pass
July 1	7/6/2022	7/9/2022	285-10	120	King Cove
July 1	7/7/2022	7/8/2022	284-90, 284-80, 285-40	148	False Pass
July 2	7/11/2022	7/12/2022	284-90	200	False Pass
July 2	7/14/2022–7/15/2022	7/16/2022	284-90, 283-17, 283-20	120	False Pass
July 2	7/30/2022–7/31/2022	8/1/2022	284-42	80	King Cove

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Temporal stratum	Harvest date(s)	Sample date(s)	Stat area(s)	Number of samples	Port location
August 1	8/15/2022	8/16/2022	284-55, 284-45	49	King Cove
August 1	8/15/2022–8/16/2022	8/17/2022	284-55	80	King Cove
August 1	8/16/2022	8/17/2022	284-55	40	King Cove
August 1 and August 2	8/16/2022–8/18/2022	8/18/2022	284-45, 284-55	39	King Cove
August 1 and August 2	8/16/2022–8/17/2022	8/18/2022	283-23, 284-47	40	King Cove
August 2	8/17/2022–8/18/2022	8/19/2022	284-42	50	King Cove
August 2	8/17/2022–8/19/2022	8/20/2022	284-55, 283-23	80	King Cove
August 2	8/18/2022	8/19/2022	284-45	30	King Cove
August 2	8/20/2022	8/21/2022	284-55	80	King Cove
August 2	8/21/2022	8/23/2022	284-55	2	King Cove
August 2	8/21/2022–8/22/2022	8/23/2022	284-45	38	King Cove
August 2	8/23/2022–8/24/2022	8/25/2022	284-42	40	King Cove
August 2	8/25/2022–8/26/2022	8/27/2022	284-45, 284-55	34	King Cove
August 2	8/27/2022	8/28/2022	284-45	5	King Cove
Total				3,894	

Appendix A2.—Unimak and Southwestern Districts, South Alaska Peninsula area, 2022. Commercial gillnet fishery tissue sampling by temporal stratum, harvest date(s), sample date(s), statistical area(s), and port location.

Temporal stratum	Harvest date(s)	Sample date(s)	Stat area(s)	Number of samples	Port location
June 1	6/10/2022	6/11/2022	285-20	240	False Pass
June 1	6/11/2022	6/12/2022	285-20	160	False Pass
June 1	6/11/2022–6/12/2022	6/13/2022	285-40	80	False Pass
June 1	6/12/2022	6/13/2022	285-20, 284-90	40	King Cove
June 1	6/12/2022	6/13/2022	285-40	40	King Cove
June 1	6/12/2022–6/13/2022	6/14/2022	285-20, 285-30	80	False Pass
June 1	6/13/2022	6/14/2022	285-40	80	King Cove
June 2	6/15/2022	6/16/2022	285-20, 285-30, 285-40, 284-90	80	False Pass
June 2	6/15/2022	6/16/2022	285-20	80	King Cove
June 2	6/16/2022	6/17/2022	284-90	80	King Cove
June 2	6/16/2022–6/17/2022	6/18/2022	285-20	160	False Pass
June 2	6/17/2022	6/18/2022	285-20	80	False Pass
June 2	6/17/2022	6/18/2022	285-20	80	King Cove
June 2	6/18/2022	6/19/2022	285-20, 284-90	80	King Cove
June 3	6/20/2022	6/21/2022	285-30	80	False Pass
June 3	6/20/2022	6/21/2022	285-20	80	King Cove
June 3	6/20/2022–6/21/2022	6/22/2022	285-40	80	King Cove
June 3	6/21/2022–6/22/2022	6/23/2022	285-30	160	False Pass
June 3	6/22/2022	6/23/2022	285-20, 285-30, 285-40	80	King Cove
June 3	6/22/2022–6/23/2022	6/24/2022	284-90, 285-20	80	King Cove
June 3	6/23/2022	6/24/2022	285-20	80	False Pass
June 4	6/25/2022	6/26/2022	285-20	80	False Pass
June 4	6/26/2022–6/27/2022	6/28/2022	285-30	80	False Pass
June 4	6/27/2022	6/28/2022	285-20	63	King Cove

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Temporal stratum	Harvest date(s)	Sample date(s)	Stat area(s)	Number of samples	Port location
July 1	7/10/2022–7/11/2022	7/12/2022	284-37, 284-39, 284-42	10	King Cove
July 1	7/19/2022	7/20/2022	284-37	80	King Cove
July 1	7/22/2022	7/23/2022	284-90	59	King Cove
July 1	7/22/2022	7/23/2022	284-90	40	King Cove
July 1	7/22/2022–7/23/2022	7/24/2022	284-38, 284-45	55	King Cove
July 2	7/26/2022	7/28/2022	284-90	40	False Pass
July 2	7/26/2022	7/28/2022	284-90	80	False Pass
July 2	7/26/2022–7/27/2022	7/28/2022	284-90	109	King Cove
July 2	7/26/2022–7/27/2022	7/28/2022	284-42, 284-62	64	King Cove
July 2	7/30/2022	7/30/2022	284-90	120	False Pass
July 2	7/30/2022–7/31/2022	8/1/2022	284-37, 283-26	40	King Cove
August	8/16/2022	8/18/2022	284-45	16	King Cove
Total				2,936	

Appendix A3.—Southeastern and South Central Districts, South Alaska Peninsula area, 2022. Commercial seine fishery tissue sampling by temporal stratum, harvest date(s), sample date(s), statistical area(s), and port location.

Temporal stratum	Harvest date(s)	Sample date(s)	Stat area(s)	Number of samples	Port location
June 1	6/11/2022	6/11/2022	282-11	240	Sand Point
June 1	6/12/2022	6/12/2022	282-42	40	Sand Point
June 1	6/12/2022	6/12/2022	282-11	120	Sand Point
June 1	6/13/2022	6/13/2022	282-11	160	Sand Point
June 2	6/15/2022	6/15/2022	282-11	120	Sand Point
June 2	6/15/2022	6/15/2022	282-11	80	Sand Point
June 2	6/16/2022	6/16/2022	282-11	120	Sand Point
June 2	6/16/2022	6/16/2022	282-11	120	Sand Point
June 3	6/20/2022	6/20/2022	282-11	240	Sand Point
June 3	6/21/2022	6/21/2022	282-11	240	Sand Point
June 4	6/25/2022	6/25/2022	282-11	240	Sand Point
June 4	6/26/2022	6/26/2022	282-11	120	Sand Point
June 4	6/26/2022	6/26/2022	282-11	120	Sand Point
July 1	7/6/2022	7/6/2022	282-11	154	Sand Point
July 1	7/6/2022	7/7/2022	282-11	46	Sand Point
July 1	7/7/2022	7/7/2022	282-11	184	Sand Point
July 1	7/6/2022–7/7/2022	7/7/2022	282-42	16	Sand Point
July 1	7/10/2022	7/10/2022	282-11	40	Sand Point
July 1	7/10/2022	7/10/2022–7/11/2022	282-11	40	Sand Point
July 1	7/10/2022	7/11/2022	282-11	120	Sand Point
July 1	7/11/2022	7/11/2022	282-11	40	Sand Point
July 1	7/10/2022–7/11/2022	7/12/2022	282-25, 282-11	160	Sand Point
July 1	7/14/2022	7/15/2022	282-20, 282-11	40	Sand Point
July 1	7/14/2022	7/15/2022	282-11	120	Sand Point
July 1 and July 2	7/14/2022–7/15/2022	7/15/2022	282-11	200	Sand Point

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Temporal stratum	Harvest date(s)	Sample date(s)	Stat area(s)	Number of samples	Port location
July 2	7/15/2022	7/15/2022	282-11	40	Sand Point
July 2	7/18/2022	7/19/2022	282-11	15	Sand Point
July 2	7/18/2022–7/19/2022	7/19/2022	282-11	305	Sand Point
July 2	7/19/2022	7/20/2022	283-17, 284-37	50	King Cove
July 3	7/22/2022	7/23/2022	282-11	160	Sand Point
July 3	7/22/2022–7/23/2022	7/23/2022	282-11	120	Sand Point
July 3	7/23/2022	7/24/2022	283-17, 283-23	80	False Pass
July 3	7/26/2022	7/26/2022	282-11	40	Sand Point
July 3	7/26/2022	7/27/2022	282-11	120	Sand Point
July 3	7/26/2022–7/27/2022	7/27/2022	282-11	200	Sand Point
July 3	7/26/2022–7/27/2022	7/28/2022	283-26	40	King Cove
July 3	7/30/2022	7/31/2022	282-11	120	Sand Point
July 3	7/30/2022–7/31/2022	7/31/2022	282-11	40	Sand Point
August 1	8/15/2022	8/15/2022	282-11	80	Sand Point
August 1	8/15/2022	8/16/2022	283-23	40	King Cove
August 1	8/15/2022–8/16/2022	8/16/2022	281-70	59	Sand Point
August 1	8/16/2022	8/16/2022	282-11	21	Sand Point
August 1	8/17/2022	8/17/2022	282-11	76	Sand Point
August 1 and August 2	8/17/2022–8/18/2022	8/18/2022	282-11	4	Sand Point
August 1 and August 2	8/17/2022–8/18/2022	8/18/2022	282-75, 282-11	40	Sand Point
August 1 and August 2	8/17/2022–8/18/2022	8/18/2022	282-11	40	Sand Point
August 1 and August 2	8/17/2022–8/18/2022	8/20/2022	282-10, 282-11, 281-67	40	King Cove
August 2	8/18/2022–8/19/2022	8/19/2022	283-15, 283-20	46	Sand Point
August 2	8/19/2022	8/19/2022	282-11	34	Sand Point
August 2	8/19/2022–8/20/2022	8/20/2022	282-11	80	Sand Point
August 2	8/20/2022	8/21/2022	282-11, 281-67	21	King Cove
August 2	8/21/2022	8/21/2022	282-11	80	Sand Point
August 2	8/22/2022	8/22/2022	281-67	40	Sand Point
Total				5,151	

Appendix A4.—Southeastern and South Central Districts, South Alaska Peninsula area, 2022. Commercial gillnet fishery tissue sampling by temporal stratum, harvest date(s), sample date(s), statistical area(s), and port location.

Temporal stratum	Harvest date(s)	Sample date(s)	Stat area(s)	Number of samples	Port location
June	6/6/2022	6/7/2022	282-11	80	Sand Point
June	6/7/2022	6/8/2022	282-11, 282-42	40	Sand Point
June	6/8/2022	6/9/2022	282-11	40	Sand Point
June	6/10/2022	6/10/2022	282-11	40	Sand Point
June	6/11/2022	6/11/2022	282-42, 282-11	40	Sand Point
June	6/12/2022	6/13/2022	282-11, 282-42	22	Sand Point
June	6/13/2022	6/14/2022	282-11, 282-42	34	Sand Point
June	6/15/2022	6/16/2022	282-11, 282-42	40	Sand Point
June	6/16/2022	6/17/2022	282-11	40	Sand Point
June	6/16/2022–6/18/2022	6/19/2022	282-20	40	Sand Point
June	6/17/2022	6/18/2022	282-11, 282-10	40	Sand Point
June	6/20/2022	6/21/2022	282-10, 282-11	40	Sand Point
June	6/21/2022	6/22/2022	282-70, 282-65, 282-75, 282-42, 282-11	40	Sand Point
June	6/22/2022	6/23/2022	282-10, 282-11, 282-42	40	Sand Point
June	6/23/2022	6/24/2022	284-36	40	Sand Point
June	6/25/2022	6/26/2022	282-11	40	Sand Point
June	6/25/2022–6/27/2022	6/27/2022	282-25	40	Sand Point
June	6/26/2022	6/26/2022	282-42	40	Sand Point
June	6/26/2022–6/28/2022	6/29/2022	282-70, 282-75	80	King Cove
June	6/28/2022	6/29/2022	282-70	40	Sand Point
June	6/28/2022	6/29/2022	282-42, 282-11	80	Sand Point
July 1	7/6/2022	7/7/2022	282-42, 282-11	80	Sand Point
July 1	7/7/2022	7/7/2022	282-11, 282-42, 282-75	120	Sand Point
July 1	7/10/2022	7/11/2022	282-42, 282-11, 282-10	80	Sand Point
July 1	7/10/2022–7/11/2022	7/12/2022	282-70	80	Sand Point
July 1	7/12/2022	7/13/2022	281-50	24	Sand Point
July 1	7/13/2022–7/14/2022	7/15/2022	282-11, 282-42, 281-50	10	Sand Point

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Temporal stratum	Harvest date(s)	Sample date(s)	Stat area(s)	Number of samples	Port location
July 1	7/14/2022	7/15/2022	282-11, 282-20	150	Sand Point
July 1	7/15/2022	7/15/2022	282-10, 282-11	80	Sand Point
July 1	7/15/2022	7/16/2022	282-42	40	Sand Point
July 1	7/15/2022	7/16/2022	282-11	40	Sand Point
July 1 and July 2	7/16/2022–7/18/2022	7/19/2022	281-50	24	King Cove
July 2	7/18/2022	7/19/2022	282-11, 282-42	120	Sand Point
July 2	7/19/2022	7/20/2022	282-10, 282-11, 282-70	80	Sand Point
July 2	7/22/2022	7/23/2022	282-11, 282-42	120	Sand Point
July 2	7/22/2022–7/23/2022	7/24/2022	283-23	46	King Cove
July 2	7/23/2022	7/24/2022	282-70	80	Sand Point
July 3	7/26/2022	7/26/2022	282-11	40	Sand Point
July 3	7/26/2022	7/27/2022	282-10, 282-11	80	Sand Point
July 3	7/27/2022	7/28/2022	282-42, 282-70	120	Sand Point
July 3	7/30/2022	7/31/2022	282-11, 282-42	120	Sand Point
August	8/4/2022–8/7/2022	8/8/2022	281-50	40	King Cove
August	8/6/2022		281-50	40	Sand Point
August	8/9/2022–8/11/2022	8/12/2022	281-50	40	King Cove
August	8/10/2022		281-50	37	Sand Point
August	8/14/2022–8/15/2022	8/15/2022–8/16/2022	281-50	34	Sand Point
August	8/15/2022	8/15/2022–8/16/2022	281-70	6	Sand Point
August	8/16/2022–8/17/2022	8/17/2022	282-75, 281-70, 281-62, 281-50	28	Sand Point
August	8/17/2022	8/17/2022	282-75, 281-70, 281-62, 281-51	12	Sand Point
August	8/17/2022–8/18/2022	8/18/2022–8/19/2022	281-65, 282-11	40	Sand Point
August	8/19/2022	8/19/2022	282-11	40	Sand Point
August	8/19/2022–8/20/2022	8/21/2022	281-40, 281-55, 281-25	19	King Cove
August	8/20/2022	8/21/2022	281-80, 281-25	40	Sand Point
August	8/24/2022–8/27/2022	8/28/2022	281-25	42	King Cove
Total				2,888	

Note: Blank cells indicate that no sampling occurred.

**APPENDIX B: ESTIMATES OF STOCK COMPOSITION
AND STOCK-SPECIFIC HARVEST OF CHUM SALMON IN
AREA, GEAR, AND TEMPORAL STRATA BY REPORTING
GROUP**

Appendix B1.–Southeastern and South Central Districts, South Alaska Peninsula area, June stratum 1, 2022, seine (June 11–13; harvest = 16,419; $n = 354$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting Group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	64.7	60.1	69.1	64.7	2.7	10,622	9,875	11,351	10,620	444
Kotzebue Sound	0.0	0.0	2.1	0.5	0.7	8	0	344	76	118
CWAK	16.2	12.9	19.8	16.2	2.1	2,661	2,124	3,244	2,665	342
Upper Yukon	0.0	0.0	0.3	0.0	0.1	0	0	43	8	23
Northern Dist.	0.0	0.0	0.5	0.1	0.2	0	0	81	13	35
Northwestern Dist.	0.0	0.0	0.4	0.1	0.2	0	0	58	9	26
South Peninsula	0.2	0.0	1.7	0.5	0.6	40	0	278	78	99
Chignik/Kodiak	1.2	0.0	2.8	1.2	0.9	193	0	457	204	140
East of Kodiak	16.6	13.5	20.1	16.7	2.0	2,732	2,220	3,298	2,745	332
								Total	16,419	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B2.—Southeastern and South Central Districts, South Alaska Peninsula area, June stratum 2, 2022, seine (June 15–16; harvest = 41,246; $n = 364$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	55.8	51.3	60.1	55.7	2.7	22,996	21,156	24,783	22,969	1,117
Kotzebue Sound	4.1	2.1	6.8	4.3	1.5	1,705	867	2,803	1,755	599
CWAK	17.1	13.5	20.8	17.1	2.2	7,056	5,565	8,589	7,063	924
Upper Yukon	0.0	0.0	0.7	0.1	0.3	1	0	296	51	139
Northern Dist.	0.4	0.0	1.8	0.6	0.6	155	0	749	229	266
Northwestern Dist.	0.0	0.0	1.3	0.3	0.5	12	0	516	106	187
South Peninsula	0.8	0.0	5.5	1.6	1.9	345	0	2,279	650	774
Chignik/Kodiak	4.4	0.5	7.8	4.4	2.1	1,817	191	3,227	1,810	873
East of Kodiak	15.9	12.9	19.6	16.0	2.1	6,577	5,312	8,105	6,613	861
							Total		41,246	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B3.—Southeastern and South Central Districts, South Alaska Peninsula area, June stratum 3, 2022, seine (June 20–21; harvest = 34,281; $n = 363$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	59.6	55.1	63.8	59.6	2.6	20,446	18,886	21,873	20,421	906
Kotzebue Sound	5.5	3.5	8.1	5.6	1.4	1,900	1,205	2,780	1,933	487
CWAK	10.0	7.4	13.1	10.1	1.8	3,426	2,547	4,501	3,471	608
Upper Yukon	0.2	0.0	1.0	0.3	0.3	74	1	355	113	116
Northern Dist.	0.0	0.0	0.6	0.1	0.2	1	0	192	32	82
Northwestern Dist.	0.7	0.1	2.0	0.9	0.6	256	30	689	292	205
South Peninsula	0.8	0.2	2.4	1.0	0.7	287	59	817	344	239
Chignik/Kodiak	0.8	0.0	2.8	1.0	0.9	283	0	955	344	322
East of Kodiak	21.4	17.9	25.1	21.4	2.2	7,327	6,146	8,608	7,330	746
							Total		34,281	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B4.—Southeastern and South Central Districts, South Alaska Peninsula area, June stratum 4, 2022, seine (June 25–26; harvest = 75,336; $n = 368$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	56.6	52.1	61.0	56.6	2.7	42,629	39,262	45,979	42,604	2,021
Kotzebue Sound	4.0	2.1	6.7	4.2	1.4	3,036	1,584	5,036	3,136	1,058
CWAK	12.2	9.2	15.5	12.3	1.9	9,177	6,930	11,690	9,243	1,467
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	153	27	76
Northern Dist.	0.0	0.0	1.1	0.2	0.4	4	0	831	149	327
Northwestern Dist.	0.7	0.1	2.2	0.9	0.7	548	58	1,649	672	519
South Peninsula	3.4	0.3	6.6	3.5	1.8	2,533	239	4,957	2,621	1,339
Chignik/Kodiak	3.3	0.3	6.4	3.3	1.8	2,490	219	4,852	2,515	1,360
East of Kodiak	19.0	15.7	22.7	19.1	2.1	14,333	11,847	17,099	14,368	1,594
								Total	75,336	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B5.—Southeastern and South Central Districts, South Alaska Peninsula area, June 2022, gillnet (June 6–28; harvest = 10,729; $n = 357$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	23.2	19.2	27.3	23.2	2.4	2,489	2,063	2,929	2,489	261
Kotzebue Sound	1.6	0.2	3.7	1.7	1.1	170	22	394	185	113
CWAK	14.3	11.0	17.8	14.3	2.1	1,536	1,181	1,912	1,538	223
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	23	4	12
Northern Dist.	0.0	0.0	0.6	0.1	0.3	0	0	64	11	32
Northwestern Dist.	0.0	0.0	0.4	0.1	0.2	0	0	42	7	23
South Peninsula	12.0	7.4	17.3	12.1	3.0	1,289	797	1,861	1,300	327
Chignik/Kodiak	16.8	11.1	22.8	16.9	3.6	1,808	1,187	2,450	1,811	384
East of Kodiak	31.5	26.9	36.1	31.5	2.7	3,385	2,886	3,870	3,384	294
								Total	10,729	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B6.—Unimak and Southwestern Districts, South Alaska Peninsula area, June stratum 1, 2022, seine (June 11–13; harvest = 24,254; $n = 346$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	48.8	44.3	53.3	48.8	2.8	11,829	10,747	12,930	11,838	667
Kotzebue Sound	2.4	0.7	4.7	2.5	1.2	582	160	1,152	609	299
CWAK	23.9	19.8	28.0	23.9	2.5	5,786	4,810	6,800	5,796	607
Upper Yukon	0.3	0.0	1.2	0.4	0.4	68	3	290	98	96
Northern Dist.	0.0	0.0	0.4	0.1	0.2	0	0	107	20	56
Northwestern Dist.	0.2	0.0	1.6	0.4	0.6	55	0	396	108	138
South Peninsula	1.6	0.0	5.4	2.0	1.9	389	0	1,318	475	451
Chignik/Kodiak	3.5	0.0	7.1	3.6	2.1	858	8	1,720	862	511
East of Kodiak	18.2	14.8	22.1	18.3	2.2	4,423	3,594	5,357	4,448	530
								Total	24,254	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B7.—Unimak and Southwestern Districts, South Alaska Peninsula area, June stratum 2, 2022, seine (June 15-18; harvest = 123,139; $n = 344$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	58.4	53.6	62.7	58.3	2.8	71,878	66,057	77,232	71,763	3,393
Kotzebue Sound	4.3	0.6	8.5	4.5	2.3	5,307	786	10,414	5,490	2,869
CWAK	21.8	17.2	27.2	22.0	3.1	26,890	21,162	33,485	27,032	3,847
Upper Yukon	0.5	0.0	1.8	0.7	0.6	656	0	2,263	816	773
Northern Dist.	0.0	0.0	1.0	0.2	0.5	4	0	1,289	228	556
Northwestern Dist.	1.8	0.6	3.7	1.9	1.0	2,234	716	4,580	2,384	1,188
South Peninsula	1.4	0.0	4.9	1.7	1.7	1,677	0	6,043	2,132	2,126
Chignik/Kodiak	1.3	0.0	4.0	1.5	1.4	1,658	0	4,933	1,851	1,740
East of Kodiak	9.2	6.7	12.1	9.3	1.7	11,321	8,286	14,926	11,441	2,035
								Total	123,139	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B8.—Unimak and Southwestern Districts, South Alaska Peninsula area, June stratum 3, 2022, seine (June 20–23; harvest = 120,443; $n = 321$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	68.7	64.2	73.0	68.6	2.6	82,705	77,373	87,889	82,649	3,150
Kotzebue Sound	2.6	0.9	4.9	2.7	1.2	3,093	1,061	5,899	3,261	1,504
CWAK	13.3	9.9	17.0	13.3	2.1	16,002	11,888	20,495	16,074	2,585
Upper Yukon	0.0	0.0	0.7	0.1	0.3	2	0	901	140	366
Northern Dist.	0.8	0.2	2.5	1.0	0.8	984	183	2,987	1,210	909
Northwestern Dist.	2.5	1.1	4.7	2.6	1.1	3,050	1,292	5,609	3,188	1,327
South Peninsula	2.5	0.6	4.9	2.6	1.3	3,065	774	5,861	3,149	1,566
Chignik/Kodiak	0.0	0.0	1.9	0.4	0.7	45	0	2,228	455	836
East of Kodiak	8.5	6.1	11.3	8.6	1.6	10,245	7,304	13,631	10,318	1,945
							Total		120,443	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B9.—Unimak and Southwestern Districts, South Alaska Peninsula area, June stratum 4, 2022, seine (June 25–28; harvest = 54,039; $n = 343$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	61.1	56.3	65.7	61.1	2.8	33,021	30,406	35,503	33,003	1,536
Kotzebue Sound	2.1	0.5	4.0	2.1	1.1	1,114	258	2,162	1,158	588
CWAK	12.9	9.7	16.8	13.0	2.1	6,961	5,255	9,056	7,031	1,142
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	112	19	55
Northern Dist.	5.1	2.8	8.1	5.2	1.6	2,755	1,498	4,372	2,833	890
Northwestern Dist.	3.1	1.4	5.4	3.2	1.2	1,676	776	2,903	1,734	658
South Peninsula	1.4	0.0	3.9	1.6	1.3	750	0	2,086	845	690
Chignik/Kodiak	0.0	0.0	3.3	0.7	1.2	24	0	1,801	387	634
East of Kodiak	12.9	10.0	16.3	13.0	1.9	6,982	5,403	8,783	7,029	1,029
								Total	54,039	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B10.—Unimak and Southwestern Districts, South Alaska Peninsula area, June stratum 1, 2022, gillnet (June 11–13; harvest = 10,797; $n = 347$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	40.3	35.6	44.8	40.3	2.9	4,351	3,845	4,840	4,351	309
Kotzebue Sound	4.9	2.3	8.1	5.1	1.8	533	252	872	546	189
CWAK	34.8	30.0	39.6	34.9	3.0	3,757	3,236	4,280	3,764	319
Upper Yukon	0.0	0.0	0.7	0.1	0.3	0	0	79	13	33
Northern Dist.	1.3	0.0	3.8	1.5	1.2	138	0	406	162	132
Northwestern Dist.	0.5	0.0	1.9	0.6	0.6	53	0	200	69	65
South Peninsula	4.1	0.2	7.1	4.0	1.9	442	23	767	434	210
Chignik/Kodiak	1.4	0.0	5.9	1.9	1.9	154	0	632	209	203
East of Kodiak	11.4	8.6	14.9	11.6	1.9	1,235	929	1,607	1,247	201
								Total	10,797	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B11.—Unimak and Southwestern Districts, South Alaska Peninsula area, June stratum 2, 2022, gillnet (June 15–18; harvest = 15,665; $n = 339$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	35.6	31.5	40.0	35.6	2.7	5,579	4,929	6,269	5,582	418
Kotzebue Sound	3.3	1.5	5.6	3.4	1.3	509	231	881	527	207
CWAK	40.6	35.8	45.5	40.6	3.0	6,363	5,602	7,121	6,359	465
Upper Yukon	0.5	0.0	2.1	0.7	0.7	83	0	322	108	108
Northern Dist.	2.7	1.0	5.1	2.8	1.3	426	158	792	446	198
Northwestern Dist.	0.0	0.0	0.5	0.1	0.2	0	0	84	14	37
South Peninsula	0.0	0.0	3.5	0.5	1.1	1	0	541	78	178
Chignik/Kodiak	4.5	0.6	7.2	4.4	1.8	707	93	1,130	696	283
East of Kodiak	11.7	8.9	15.1	11.8	1.9	1,839	1,392	2,358	1,855	292
								Total	15,665	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B12.—Unimak and Southwestern Districts, South Alaska Peninsula area, June stratum 3, 2022, gillnet (June 20–23; harvest = 16,302; $n = 345$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	40.9	36.4	45.5	41.0	2.7	6,668	5,940	7,419	6,681	445
Kotzebue Sound	4.7	2.6	8.2	4.9	1.7	763	416	1,329	804	280
CWAK	37.1	32.3	42.1	37.1	3.0	6,045	5,258	6,869	6,048	482
Upper Yukon	0.9	0.2	2.3	1.0	0.7	152	31	378	171	110
Northern Dist.	0.7	0.1	2.1	0.8	0.7	113	9	345	138	110
Northwestern Dist.	1.4	0.5	2.9	1.5	0.7	232	82	470	248	120
South Peninsula	1.2	0.0	3.3	1.3	1.0	195	0	536	218	170
Chignik/Kodiak	1.3	0.0	4.0	1.5	1.3	215	0	652	245	215
East of Kodiak	10.7	7.9	13.9	10.7	1.8	1,742	1,286	2,263	1,750	291
								Total	16,302	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B13.—Unimak and Southwestern Districts, South Alaska Peninsula area, June stratum 4, 2022, gillnet (June 25–28; harvest = 1,487; $n = 214$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	35.2	29.5	40.8	35.2	3.5	523	439	607	523	52
Kotzebue Sound	4.7	2.2	8.1	4.8	1.8	70	33	120	72	26
CWAK	26.4	20.2	32.5	26.4	3.7	392	300	484	393	55
Upper Yukon	0.0	0.0	0.4	0.1	0.2	0	0	6	1	3
Northern Dist.	0.2	0.0	5.7	1.4	2.1	3	0	85	21	31
Northwestern Dist.	5.8	2.5	9.8	6.0	2.3	86	38	146	89	34
South Peninsula	1.1	0.0	4.5	1.5	1.6	16	0	67	22	24
Chignik/Kodiak	4.7	0.9	9.7	4.9	2.7	69	13	144	73	40
East of Kodiak	19.6	15.0	24.8	19.8	3.0	291	224	369	294	45
								Total	1,487	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B14.—Southeastern and South Central Districts, South Alaska Peninsula area, July stratum 1, 2022, seine (July 6–14; harvest = 32,704; $n = 369$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	22.5	19.1	26.2	22.6	2.2	7,372	6,231	8,584	7,397	723
Kotzebue Sound	0.1	0.0	0.9	0.2	0.3	19	0	285	67	102
CWAK	3.7	2.2	5.6	3.8	1.0	1,219	734	1,831	1,244	342
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	66	12	35
Northern Dist.	0.7	0.0	1.9	0.8	0.6	219	10	623	259	201
Northwestern Dist.	1.4	0.3	3.2	1.5	0.9	459	112	1,038	502	288
South Peninsula	20.2	11.8	29.0	20.4	5.1	6,612	3,857	9,474	6,666	1,680
Chignik/Kodiak	20.3	11.8	29.1	20.3	5.2	6,646	3,870	9,506	6,639	1,694
East of Kodiak	30.2	26.0	34.8	30.3	2.7	9,882	8,507	11,373	9,917	868
								Total	32,704	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B15.—Southeastern and South Central Districts, South Alaska Peninsula area, July stratum 2, 2022, seine (July 15–21; harvest = 36,682; $n = 353$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	14.6	11.8	18.0	14.7	1.9	5,364	4,311	6,591	5,384	692
Kotzebue Sound	0.0	0.0	0.2	0.0	0.1	0	0	81	13	35
CWAK	0.7	0.1	1.7	0.8	0.5	245	46	621	282	182
Upper Yukon	0.0	0.0	0.5	0.1	0.2	1	0	169	29	67
Northern Dist.	0.0	0.0	0.5	0.1	0.2	1	0	190	34	88
Northwestern Dist.	0.0	0.0	0.8	0.1	0.4	1	0	308	54	137
South Peninsula	21.1	14.7	27.9	21.2	4.1	7,758	5,376	10,249	7,772	1,498
Chignik/Kodiak	14.5	8.3	22.1	14.7	4.2	5,333	3,038	8,091	5,407	1,547
East of Kodiak	48.2	43.5	53.1	48.3	2.9	17,683	15,971	19,474	17,706	1,064
								Total	36,682	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B16.—Southeastern and South Central Districts, South Alaska Peninsula area, July stratum 3, 2022, seine (July 22–31; harvest = 56,716; $n = 354$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	6.0	4.1	8.2	6.0	1.3	3,392	2,314	4,654	3,430	725
Kotzebue Sound	0.0	0.0	0.8	0.2	0.3	14	0	444	95	164
CWAK	0.5	0.0	1.7	0.7	0.6	303	23	970	379	314
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	106	19	55
Northern Dist.	0.0	0.0	1.3	0.2	0.5	2	0	756	135	311
Northwestern Dist.	0.9	0.0	3.9	1.3	1.3	492	0	2,185	717	734
South Peninsula	35.4	26.5	43.6	35.3	5.1	20,075	15,038	24,706	20,037	2,906
Chignik/Kodiak	14.8	7.7	23.5	15.1	4.7	8,392	4,340	13,344	8,578	2,674
East of Kodiak	41.2	36.7	45.6	41.1	2.7	23,348	20,840	25,881	23,327	1,531
								Total	56,716	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B17.—Southeastern and South Central Districts, South Alaska Peninsula area, July stratum 1, 2022, gillnet (July 6–17; harvest = 4,092; $n = 329$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	0.9	0.2	2.2	1.0	0.6	36	8	89	41	25
Kotzebue Sound	0.9	0.2	2.1	1.0	0.6	36	8	87	40	25
CWAK	0.5	0.1	1.7	0.7	0.5	22	2	68	27	22
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	8	1	5
Northern Dist.	0.0	0.0	1.1	0.2	0.5	0	0	46	8	22
Northwestern Dist.	0.4	0.0	2.2	0.6	0.7	16	0	89	26	30
South Peninsula	34.9	26.6	44.3	35.2	5.4	1,429	1,088	1,812	1,441	222
Chignik/Kodiak	45.7	36.3	54.9	45.6	5.6	1,868	1,484	2,246	1,867	231
East of Kodiak	15.6	11.8	19.8	15.7	2.4	638	482	810	641	100
								Total	4,092	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B18.—Southeastern and South Central Districts, South Alaska Peninsula area, July stratum 2, 2022, gillnet (July 18–25; harvest = 4,833; $n = 355$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	1.1	0.3	2.4	1.2	0.7	51	15	118	57	32
Kotzebue Sound	0.0	0.0	0.5	0.1	0.2	0	0	23	4	10
CWAK	0.8	0.2	1.9	0.9	0.6	39	9	94	45	27
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	10	2	5
Northern Dist.	0.0	0.0	0.5	0.1	0.2	0	0	25	4	12
Northwestern Dist.	0.0	0.0	1.0	0.2	0.4	1	0	47	10	19
South Peninsula	30.9	18.3	44.7	31.0	8.1	1,496	884	2,162	1,499	390
Chignik/Kodiak	49.5	35.7	62.4	49.5	8.3	2,393	1,724	3,015	2,394	400
East of Kodiak	16.8	12.8	21.4	16.9	2.6	812	617	1,034	819	128
								Total	4,833	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B19.—Southeastern and South Central Districts, South Alaska Peninsula area, July stratum 3, 2022, gillnet (July 26–31; harvest = 5,189; $n = 308$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	0.9	0.3	2.1	1.0	0.6	47	13	108	51	30
Kotzebue Sound	0.0	0.0	0.2	0.0	0.1	0	0	12	2	6
CWAK	0.0	0.0	0.3	0.0	0.1	0	0	13	2	7
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	10	2	6
Northern Dist.	0.0	0.0	1.2	0.2	0.5	0	0	61	10	27
Northwestern Dist.	0.0	0.0	1.5	0.3	0.7	0	0	77	14	34
South Peninsula	34.8	26.1	44.0	34.9	5.6	1,807	1,356	2,286	1,810	292
Chignik/Kodiak	37.2	27.5	46.9	37.1	5.9	1,928	1,428	2,432	1,927	304
East of Kodiak	26.4	22.0	31.1	26.4	2.8	1,369	1,140	1,612	1,371	147
								Total	5,189	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B20.—Unimak and Southwestern Districts, South Alaska Peninsula area, July stratum 1, 2022, seine (July 6–7; harvest = 30,008; $n = 246$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	37.4	32.4	42.8	37.5	3.2	11,232	9,719	12,836	11,241	955
Kotzebue Sound	5.5	2.6	9.2	5.7	2.0	1,651	770	2,753	1,703	605
CWAK	14.5	10.2	19.3	14.6	2.8	4,348	3,058	5,801	4,371	841
Upper Yukon	0.0	0.0	0.4	0.1	0.2	0	0	114	18	53
Northern Dist.	5.7	2.3	9.9	5.9	2.4	1,725	680	2,968	1,766	711
Northwestern Dist.	5.7	3.0	9.0	5.8	1.8	1,708	901	2,694	1,740	549
South Peninsula	1.6	0.0	5.8	2.0	1.9	478	0	1,747	613	563
Chignik/Kodiak	6.9	2.5	11.6	7.0	2.8	2,060	746	3,473	2,087	828
East of Kodiak	21.5	17.3	26.1	21.6	2.7	6,444	5,190	7,828	6,467	805
								Total	30,008	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B21.—Unimak and Southwestern Districts, South Alaska Peninsula area, July stratum 2, 2022, seine (July 8–31; harvest = 12,708; $n = 322$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	16.0	12.6	19.7	16.1	2.2	2,036	1,607	2,505	2,046	276
Kotzebue Sound	0.8	0.0	2.7	1.0	0.9	107	0	342	126	114
CWAK	7.5	4.9	10.5	7.6	1.7	950	628	1,333	962	215
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	26	5	16
Northern Dist.	1.5	0.0	3.8	1.7	1.2	192	1	477	212	147
Northwestern Dist.	5.0	2.9	7.7	5.1	1.5	641	365	972	651	192
South Peninsula	29.1	21.7	37.0	29.3	4.6	3,703	2,756	4,702	3,721	589
Chignik/Kodiak	23.1	15.2	31.5	23.2	4.9	2,939	1,926	4,008	2,945	628
East of Kodiak	16.0	12.3	20.1	16.0	2.4	2,031	1,565	2,554	2,039	308
								Total	12,708	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B22.—Unimak and Southwestern Districts, South Alaska Peninsula area, July stratum 1, 2022, gillnet (July 6–24; harvest = 2,027; $n = 226$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	3.9	2.0	6.4	4.0	1.4	79	41	131	82	28
Kotzebue Sound	0.0	0.0	0.4	0.1	0.2	0	0	7	1	3
CWAK	1.7	0.3	4.7	2.0	1.4	34	7	96	41	28
Upper Yukon	0.0	0.0	0.3	0.0	0.2	0	0	6	1	3
Northern Dist.	3.5	0.0	8.6	3.8	2.8	71	0	175	77	56
Northwestern Dist.	4.1	1.5	8.9	4.5	2.3	83	30	181	91	46
South Peninsula	38.4	26.4	49.1	38.3	7.1	778	535	996	776	143
Chignik/Kodiak	26.5	16.9	39.5	27.2	6.9	537	343	800	552	139
East of Kodiak	20.0	14.9	25.3	20.0	3.1	405	303	513	406	64
								Total	2,027	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B23.—Unimak and Southwestern Districts, South Alaska Peninsula area, July stratum 2, 2022, gillnet (July 25–31; harvest = 3,812; $n = 334$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	1.5	0.5	3.1	1.7	0.8	59	20	120	63	31
Kotzebue Sound	0.0	0.0	0.2	0.0	0.1	0	0	9	2	5
CWAK	0.8	0.2	2.1	0.9	0.6	32	7	78	36	23
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	9	1	4
Northern Dist.	0.0	0.0	1.3	0.2	0.6	0	0	51	9	23
Northwestern Dist.	9.2	5.4	13.5	9.3	2.4	350	206	514	353	93
South Peninsula	67.2	57.7	79.6	67.7	6.5	2,561	2,199	3,034	2,582	248
Chignik/Kodiak	13.8	0.1	23.1	13.3	6.5	527	3	879	508	248
East of Kodiak	6.6	4.2	9.6	6.8	1.7	252	161	365	257	63
								Total	3,812	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B24.—Southeastern and South Central Districts, South Alaska Peninsula area, August stratum 1, 2022, seine (August 1–17; harvest = 35,706; $n = 355$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	1.9	0.9	3.3	2.0	0.7	683	333	1,189	712	253
Kotzebue Sound	0.0	0.0	0.6	0.1	0.2	2	0	207	39	79
CWAK	0.1	0.0	0.9	0.2	0.3	50	0	310	89	107
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	74	12	34
Northern Dist.	0.0	0.0	1.0	0.2	0.4	1	0	374	60	156
Northwestern Dist.	0.0	0.0	0.6	0.1	0.4	0	0	232	42	147
South Peninsula	38.7	29.7	48.4	38.9	5.7	13,830	10,607	17,297	13,903	2,033
Chignik/Kodiak	55.1	45.8	64.6	55.1	5.7	19,677	16,364	23,068	19,678	2,037
East of Kodiak	3.2	1.8	5.1	3.3	1.0	1,132	635	1,830	1,171	372
								Total	35,706	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B25.—Southeastern and South Central Districts, South Alaska Peninsula area, August stratum 2, 2022, seine (August 18–31; harvest = 9,793; $n = 279$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	1.3	0.5	2.9	1.5	0.7	130	49	283	143	73
Kotzebue Sound	0.0	0.0	0.3	0.0	0.1	0	0	28	5	13
CWAK	0.0	0.0	0.2	0.0	0.1	0	0	22	4	14
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	20	4	12
Northern Dist.	0.0	0.0	0.4	0.1	0.2	0	0	38	7	22
Northwestern Dist.	0.0	0.0	1.6	0.3	0.6	1	0	161	28	62
South Peninsula	49.1	36.1	60.5	48.8	7.4	4,813	3,532	5,926	4,783	721
Chignik/Kodiak	41.2	29.6	54.5	41.5	7.5	4,036	2,901	5,339	4,068	731
East of Kodiak	7.5	4.4	11.4	7.7	2.2	739	432	1,114	751	211
								Total	9,793	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B26.—Unimak and Southwestern Districts, South Alaska Peninsula area, August stratum 1, 2022, seine (August 15–16; harvest = 18,807; $n = 183$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	0.0	0.0	0.5	0.1	0.3	0	0	101	18	53
Kotzebue Sound	0.0	0.0	0.4	0.1	0.2	0	0	71	12	35
CWAK	0.0	0.0	0.4	0.1	0.2	0	0	76	13	36
Upper Yukon	0.0	0.0	0.3	0.1	0.2	0	0	61	11	32
Northern Dist.	0.0	0.0	1.2	0.2	0.5	1	0	224	40	100
Northwestern Dist.	0.0	0.0	0.8	0.1	0.4	0	0	142	25	70
South Peninsula	91.5	75.5	99.5	90.3	8.0	17,206	14,190	18,705	16,981	1,499
Chignik/Kodiak	7.1	0.0	23.5	8.4	7.9	1,338	0	4,420	1,581	1,489
East of Kodiak	0.5	0.0	1.9	0.7	0.6	91	8	366	127	120
								Total	18,807	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B27.—Unimak and Southwestern Districts, South Alaska Peninsula area, August stratum 2, 2022, seine (August 17–31; harvest = 10,017; $n = 312$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	0.0	0.0	0.4	0.1	0.2	0	0	35	6	17
Kotzebue Sound	0.0	0.0	0.3	0.0	0.1	0	0	26	4	11
CWAK	0.0	0.0	0.2	0.0	0.1	0	0	21	4	11
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	20	3	10
Northern Dist.	0.0	0.0	1.2	0.2	0.7	0	0	122	22	66
Northwestern Dist.	14.0	10.3	19.0	14.2	2.7	1,401	1,036	1,906	1,424	266
South Peninsula	82.0	74.1	87.3	81.5	4.1	8,210	7,424	8,750	8,165	409
Chignik/Kodiak	1.6	0.0	8.9	2.8	3.2	157	0	891	277	320
East of Kodiak	1.0	0.3	2.4	1.1	0.7	97	32	244	112	67
								Total	10,017	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

Appendix B28.—South Alaska Peninsula area, August 2022, gillnet (August 1–31; harvest = 7,048; $n = 397$). Estimates of stock composition (%) and stock-specific harvest including median, 90% credibility interval, mean and standard deviation (SD).

Reporting group	Stock composition					Stock-specific harvest				
	Median	90% CI		Mean	SD	Median	90% CI		Mean	SD
		5%	95%				5%	95%		
Asia	0.0	0.0	1.1	0.2	0.4	1	0	79	15	27
Kotzebue Sound	0.0	0.0	0.2	0.0	0.1	0	0	12	2	6
CWAK	0.0	0.0	0.2	0.0	0.1	0	0	12	2	6
Upper Yukon	0.0	0.0	0.2	0.0	0.1	0	0	12	2	6
Northern Dist.	0.0	0.0	0.5	0.1	0.3	0	0	35	6	18
Northwestern Dist.	0.0	0.0	0.6	0.1	0.2	0	0	39	7	17
South Peninsula	64.0	54.5	73.3	63.9	5.8	4,511	3,838	5,164	4,504	411
Chignik/Kodiak	33.0	23.6	42.8	33.1	5.8	2,325	1,664	3,017	2,332	412
East of Kodiak	2.4	1.1	4.2	2.5	1.0	170	78	297	178	68
								Total	7,048	

Note: Stock composition means may not sum to 100% and stock-specific harvest means may not sum to the total harvest due to rounding error.

**APPENDIX C: ESTIMATES OF AGE COMPOSITION OF
CHUM SALMON IN AREAS, GEAR TYPES, AND
TEMPORAL STRATA**

Appendix C1.—Southeastern and South Central Districts, South Alaska Peninsula area, June stratum 1, 2022, seine (June 11–13; harvest = 16,419; $n = 560$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	12	2.4	1.2	3.6	0.7	12	520.3	508.8	531.9	24.4
0.3	317	63.3	59.6	66.9	2.2	317	545.7	542.8	548.5	31.0
0.4	167	33.3	29.8	36.9	2.1	167	561.9	557.5	566.4	34.9
0.5	4	0.8	0.0	1.6	0.4	4	578.5	550.3	606.7	34.3
0.6	1	0.2	0.0	0.6	0.2	1	587.0	587.0	587.0	—
Unknown						59	548.4	539.8	557.0	40.2
Total	501					560	550.6	548.2	553.0	34.2

Note: En dash (—) = no data available.

Appendix C2.—Southeastern and South Central Districts, South Alaska Peninsula area, June stratum 2, 2022, seine (June 15–16; harvest = 41,246; $n = 440$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	8	2.0	0.7	3.3	0.7	8	513.3	500.3	526.2	22.2
0.3	259	65.1	61.0	69.1	2.4	259	547.9	544.8	551.0	30.0
0.4	128	32.2	28.2	36.2	2.3	128	561.5	555.9	567.0	38.3
0.5	3	0.8	—	1.6	0.4	3	626.0	602.9	649.1	24.2
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						42	552.0	543.8	560.2	32.2
Total	398					440	552.1	549.5	554.8	34.1

Note: En dash (—) = no data available.

Appendix C3.—Southeastern and South Central Districts, South Alaska Peninsula area, June stratum 3, 2022, gillnet (June 20–21; harvest = 34,281; $n = 480$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	4	1.0	0.1	1.9	0.5	4	539.0	527.4	550.6	14.1
0.3	264	64.4	60.4	68.4	2.4	264	565.6	561.7	569.6	39.0
0.4	134	32.7	28.7	36.6	2.3	134	576.1	570.4	581.7	39.9
0.5	8	2.0	0.7	3.2	0.7	8	607.6	590.1	625.2	30.1
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						70	561.3	553.4	569.2	40.0
Total	410					480	568.4	565.4	571.4	39.8

Note: En dash (—) = no data available.

Appendix C4.—Southeastern and South Central Districts, South Alaska Peninsula area, June stratum 4, 2022, seine (June 25–26; harvest = 75,336; $n = 480$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	26	6.1	4.1	8.1	1.2	26	517.5	508.3	526.8	28.7
0.3	298	70.0	66.2	73.7	2.2	298	548.1	544.4	551.9	39.4
0.4	97	22.8	19.3	26.2	2.0	97	561.5	554.7	568.4	40.9
0.5	5	1.2	0.2	2.2	0.5	5	572.2	557.2	587.2	20.4
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						54	548.0	538.7	557.2	41.3
Total	426					480	549.4	546.4	552.4	40.3

Note: En dash (—) = no data available.

Appendix C5.—Southeastern and South Central Districts, South Alaska Peninsula area, June 2022, seine (June 11–26; harvest = 167,198; $n = 1,960$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	50	2.9	2.2	3.6	0.4	50	519.2	513.2	525.3	26.0
0.3	1,138	65.6	63.7	67.5	1.1	1,138	551.5	549.7	553.2	35.9
0.4	526	30.3	28.5	32.2	1.1	526	565.3	562.6	568.1	38.6
0.5	20	1.2	0.7	1.6	0.3	20	595.7	583.6	607.8	32.9
0.6	1	0.1	0.0	0.2	0.1	1	587.0	587.0	587.0	—
Unknown						225	553.0	548.7	557.3	39.2
Total	1,735					1,960	555.0	553.6	556.4	37.9

Note: En dash (—) = no data available.

Appendix C6.— Appendix C6.-Southeastern and South Central Districts, South Alaska Peninsula area, June 2022, gillnet (June 6–28; harvest = 10,729; $n = 936$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	10	1.3	0.6	1.9	0.4	10	521.8	501.0	542.6	39.9
0.3	434	54.3	51.5	57.2	1.7	434	549.5	547.5	551.6	26.3
0.4	351	43.9	41.1	46.8	1.7	351	570.2	567.4	572.9	31.5
0.5	4	0.5	0.0	1.0	0.2	4	568.5	537.4	599.6	37.8
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						137	555.1	550.6	559.6	32.2
Total	799					936	557.9	556.2	559.5	31.1

Note: En dash (—) = no data available.

Appendix C7.—Southwestern and Unimak Districts, South Alaska Peninsula area, June stratum 1, 2022, seine (June 11–13; harvest = 24,254; $n = 582$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	13	2.7	1.4	4.0	0.7	13	508.1	495.8	520.3	26.8
0.3	305	63.1	59.4	66.9	2.2	305	534.4	531.4	537.3	31.3
0.4	163	33.7	30.1	37.4	2.2	163	550.7	545.8	555.7	38.1
0.5	2	0.4	(0.2)	1.0	0.3	2	559.5	510.9	608.1	41.7
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						99	529.3	525.2	533.3	24.6
Total	483					582	537.6	535.3	539.9	33.6

Note: En dash (—) = no data available.

Appendix C8.—Southwestern and Unimak Districts, South Alaska Peninsula area, June stratum 2, 2022, seine (June 15–18; harvest = 123,139; $n = 640$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	24	4.7	3.1	6.4	0.9	24	488.4	474.3	502.4	41.8
0.3	376	73.7	70.4	77.0	2.0	376	532.5	530.0	534.9	28.9
0.4	109	21.4	18.3	24.5	1.8	109	549.7	544.5	554.9	33.1
0.5	1	0.2	0.0	0.6	0.2	1	539.0	539.0	539.0	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						130	529.6	524.7	534.4	33.6
Total	510					640	533.2	531.0	535.3	33.0

Note: En dash (—) = no data available.

Appendix C9.—Southwestern and Unimak Districts, South Alaska Peninsula area, June stratum 3, 2022, seine (June 20–23; harvest = 120,443; $n = 679$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	48	7.8	5.9	9.7	1.1	48	501.8	493.9	509.7	33.2
0.3	435	70.6	67.5	73.7	1.8	435	529.5	526.9	532.0	32.4
0.4	131	21.3	18.5	24.1	1.7	131	541.2	535.9	546.5	37.0
0.5	2	0.3	0.0	0.8	0.2	2	596.5	569.3	623.7	23.3
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						63	528.2	519.8	536.6	40.6
Total	616					679	529.9	527.6	532.1	35.5

Note: En dash (—) = no data available.

Appendix C10.—Southwestern and Unimak Districts, South Alaska Peninsula area, June stratum 4, 2022, seine (June 25–28; harvest = 54,039; $n = 718$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and standard deviation (SD).

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	88	13.6	11.3	15.9	1.4	88	484.4	477.2	491.7	41.1
0.3	406	62.9	59.7	66.2	1.9	406	527.3	524.4	530.2	35.9
0.4	147	22.8	20.0	25.6	1.7	147	541.7	536.4	547.1	39.4
0.5	4	0.6	0.0	1.2	0.3	4	610.8	600.5	621.0	12.5
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						73	521.2	512.8	529.7	43.7
Total	645					718	524.9	522.3	527.4	41.8

Note: En dash (—) = no data available.

Appendix C11.–Southwestern and Unimak Districts, South Alaska Peninsula area, June 2022, seine (June 11–28; harvest = 321,544; $n = 2,619$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	–	–	–	–	0	–	–	–	–
0.2	173	7.7	6.7	8.6	0.6	173	491.6	486.7	496.4	38.9
0.3	1,522	67.5	65.9	69.2	1.0	1,522	530.6	529.3	532.0	32.4
0.4	550	24.4	22.9	25.9	0.9	550	545.9	543.2	548.5	37.5
0.5	9	0.4	0.2	0.6	0.1	9	588.2	569.8	606.6	33.5
0.6	0	–	–	–	–	0	–	–	–	–
Unknown						365	527.6	524.6	530.6	35.1
Total	2,254					2,619	531.0	529.8	532.2	36.6

Note: En dash (–) = no data available.

Appendix C12.—Southwestern and Unimak Districts, South Alaska Peninsula area, June stratum 1, 2022, gillnet (June 11-13; harvest = 10,797; $n = 720$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	7	1.1	0.4	1.9	0.4	7	507.1	487.3	527.0	31.8
0.3	373	61.1	57.9	64.4	1.9	373	538.0	535.5	540.5	29.3
0.4	223	36.6	33.4	39.8	1.9	223	555.2	551.7	558.6	31.3
0.5	7	1.1	0.4	1.9	0.4	7	559.3	541.2	577.4	29.0
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						110	526.5	521.5	531.6	32.3
Total	610					720	541.5	539.5	543.4	32.2

Note: En dash (—) = no data available.

Appendix C13.—Southwestern and Unimak Districts, South Alaska Peninsula area, June stratum 2, 2022, gillnet (June 15–18; harvest = 15,665; $n = 640$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	15	2.8	1.5	4.1	0.7	15	522.7	512.3	533.2	24.6
0.3	370	69.2	65.8	72.5	2.0	370	537.4	535.2	539.6	26.0
0.4	150	28.0	24.7	31.3	1.9	150	547.7	543.9	551.5	28.2
0.5	0	—	—	—	—	0	—	—	—	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						105	539.0	534.2	543.8	29.8
Total	535					640	539.7	537.9	541.5	27.5

Note: En dash (—) = no data available.

Appendix C14.–Southwestern and Unimak Districts, South Alaska Peninsula area, June stratum 3, 2022, gillnet (June 20–23; harvest = 16,302; $n = 640$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	–	–	–	–	0	–	–	–	–
0.2	11	2.0	0.9	3.0	0.6	11	517.8	509.7	526.0	16.4
0.3	379	67.2	63.8	70.5	2.0	379	538.9	536.5	541.3	28.1
0.4	170	30.1	26.9	33.4	1.9	170	545.9	542.1	549.7	30.1
0.5	4	0.7	0.0	1.4	0.4	4	573.0	539.8	606.2	40.3
0.6	0	–	–	–	–	0	–	–	–	–
Unknown						76	535.7	529.9	541.5	30.9
Total	564					640	540.2	538.3	542.1	29.3

Note: En dash (–) = no data available.

Appendix C15.—Southwestern and Unimak Districts, South Alaska Peninsula area, June stratum 4, 2022, gillnet (June 25–28; harvest = 1,487; $n = 223$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	9	4.8	2.1	7.5	1.5	9	520.8	512.6	528.9	14.8
0.3	129	68.6	63.1	74.1	3.2	129	534.4	530.1	538.6	29.4
0.4	49	26.1	20.8	31.3	3.0	49	552.0	544.1	559.9	33.4
0.5	1	0.5	0.0	1.6	0.5	1	592.0	592.0	592.0	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						35	531.4	522.7	540.1	31.2
Total	188	1.00				223	537.5	534.0	540.9	31.3

Note: En dash (—) = no data available.

Appendix C16.—Southwestern and Unimak Districts, South Alaska Peninsula area, June 2022, gillnet (June 11–28; harvest = 44,334; $n = 2,223$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age Composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	42	2.2	1.6	2.8	0.3	42	518.4	512.8	524.1	22.2
0.3	1,251	65.9	64.1	67.8	1.1	1,251	537.7	536.4	539.0	28.0
0.4	592	31.2	29.4	33.0	1.1	592	550.4	548.3	552.4	30.6
0.5	12	0.6	0.3	1.0	0.2	12	566.6	551.5	581.7	31.8
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						326	533.2	530.3	536.1	31.4
Total	1,897					2,223	540.2	539.2	541.3	30.0

Note: En dash (—) = no data available.

Appendix C17.—Southeastern and South Central Districts, South Alaska Peninsula area, July stratum 1, 2022, seine (July 6–14; harvest = 32,704; $n = 369$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	37	3.8	2.7	4.8	0.6	37	519.4	507.1	531.6	45.3
0.3	660	67.4	64.9	69.9	1.5	660	567.4	564.8	570.0	40.8
0.4	279	28.5	26.1	30.9	1.4	279	579.8	576.0	583.5	37.8
0.5	3	0.3	0.0	0.6	0.2	3	621.0	532.6	709.4	93.0
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						141	555.8	549.1	562.5	48.3
Total	979					1,120	567.6	565.5	569.7	43.0

Note: En dash (—) = no data available.

Appendix C18.—Southeastern and South Central Districts, South Alaska Peninsula area, July stratum 2, 2022, seine (July 15–21; harvest = 36,682; $n = 450$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	28	7.1	4.9	9.4	1.3	28	511.3	492.9	529.6	59.0
0.3	292	74.3	70.5	78.1	2.2	292	572.1	568.3	576.0	40.0
0.4	72	18.3	15.0	21.7	2.0	72	580.0	571.8	588.1	41.9
0.5	1	0.3	0.0	0.8	0.3	1	604.0	604.0	604.0	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						57	562.1	550.2	573.9	54.1
Total	393					450	568.4	564.8	572.0	46.1

Note: En dash (—) = no data available.

Appendix C19.—Southeastern and South Central Districts, South Alaska Peninsula area, July stratum 3, 2022, seine (July 22–31; harvest = 56,716; $n = 920$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	1	0.1	0.0	0.4	0.1	1	415.0	415.0	415.0	—
0.2	72	9.3	7.5	11.0	1.0	72	526.6	520.1	533.2	33.8
0.3	516	66.3	63.5	69.2	1.7	516	576.2	573.4	579.1	39.1
0.4	189	24.3	21.7	26.9	1.5	189	580.4	576.4	584.4	33.5
0.5	0	—	—	—	—	0	—	—	—	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						142	562.5	555.9	569.1	47.9
Total	778					920	570.9	568.6	573.2	41.8

Note: En dash (—) = no data available.

Appendix C20.—Southeastern and South Central Districts, South Alaska Peninsula area, July 2022, seine (July 6–31; harvest = 126,245; $n = 2,490$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	1	0.0	0.0	0.1	0.0	1	415.0	415.0	415.0	—
0.2	137	6.4	5.5	7.3	0.5	137	521.5	515.4	527.6	43.2
0.3	1,468	68.3	66.6	70.0	1.0	1,468	571.5	569.7	573.2	40.2
0.4	540	25.1	23.6	26.7	0.9	540	580.0	577.4	582.6	36.9
0.5	4	0.2	0.0	0.4	0.1	4	616.8	553.9	679.6	76.4
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						340	559.6	555.3	564.0	49.1
Total	2,150					2,490	569.0	567.5	570.4	43.2

Note: En dash (—) = no data available.

Appendix C21.—Southeastern and South Central Districts, South Alaska Peninsula area, July stratum 1, 2022, gillnet (July 6–17; harvest = 4,092; $n = 728$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	12	1.9	1.0	2.8	0.5	12	540.6	526.2	554.9	30.2
0.3	373	59.7	56.6	62.7	1.8	373	561.9	559.5	564.3	28.6
0.4	237	37.9	34.9	40.9	1.8	237	575.4	572.1	578.6	30.3
0.5	3	0.5	0.0	1.0	0.3	3	595.0	577.2	612.8	18.7
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						103	561.9	556.5	567.3	33.4
Total	625					728	566.1	564.2	567.9	30.7

Note: En dash (—) = no data available.

Appendix C22.—Southeastern and South Central Districts, South Alaska Peninsula area, July stratum 2, 2022, gillnet (July 18–25; harvest = 4,833; $n = 446$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	15	3.9	2.2	5.6	1.0	15	560.8	548.5	573.1	28.8
0.3	257	67.3	63.3	71.2	2.3	257	564.1	561.1	567.1	29.1
0.4	109	28.5	24.7	32.3	2.2	109	573.1	568.5	577.6	28.8
0.5	1	0.3	0.0	0.8	0.3	1	590.0	590.0	590.0	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						64	558.5	552.1	564.9	31.0
Total	382					446	565.4	563.1	567.8	29.6

Note: En dash (—) = no data available.

Appendix C23.—Southeastern and South Central Districts, South Alaska Peninsula area, July stratum 3, 2022, gillnet (July 26–31; harvest = 5,189; $n = 360$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	16	5.3	3.1	7.5	1.3	16	527.1	514.6	539.6	30.3
0.3	190	62.9	58.3	67.5	2.7	190	564.6	561.5	567.7	26.1
0.4	96	31.8	27.3	36.3	2.6	96	575.3	570.7	579.9	27.1
0.5	0	—	—	—	—	0	—	—	—	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						58	560.3	552.8	567.8	34.6
Total	302					360	565.1	562.5	567.7	29.6

Note: En dash (—) = no data available.

Appendix C24.—Southeastern and South Central Districts, South Alaska Peninsula area, July 2022, gillnet (July 6–31; harvest = 14,106; $n = 1,534$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	43	3.3	2.5	4.1	0.5	43	542.6	534.5	550.8	32.5
0.3	820	62.6	60.5	64.8	1.3	820	563.2	561.6	564.8	28.2
0.4	442	33.8	31.7	35.9	1.2	442	574.8	572.5	577.1	29.2
0.5	4	0.3	0.0	0.6	0.1	4	593.8	581.0	606.5	15.5
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						225	560.5	556.9	564.1	32.9
Total	1,309					1,534	565.7	564.4	566.9	30.1

Note: En dash (—) = no data available.

Appendix C25.—Southwestern and Unimak Districts, South Alaska Peninsula area, July stratum 1, 2022, seine (July 6–7; harvest = 30,008; $n = 268$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	9	4.5	1.8	7.2	1.5	9	529.9	510.5	549.3	35.3
0.3	145	72.5	67.0	78.0	3.2	145	574.1	567.3	580.9	49.5
0.4	45	22.5	17.4	27.6	3.0	45	584.2	574.2	594.3	40.9
0.5	1	0.5	0.0	1.6	0.5	1	714.0	714.0	714.0	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						68	568.1	556.3	580.0	59.1
Total	200					268	573.3	568.1	578.5	51.7

Note: En dash (—) = no data available.

Appendix C26.—Southwestern and Unimak Districts, South Alaska Peninsula area, July stratum 2, 2022, seine (July 8–31; harvest = 12,708; $n = 400$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	13	4.2	2.1	6.2	1.1	13	534.7	511.9	557.5	49.9
0.3	191	61.0	56.3	65.7	2.8	191	573.9	569.6	578.1	35.8
0.4	108	34.5	29.9	39.1	2.7	108	585.0	579.6	590.3	33.9
0.5	1	0.3	0.0	1.0	0.3	1	699.0	699.0	699.0	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						87	566.6	557.0	576.2	54.5
Total	313					400	574.3	570.9	577.8	42.1

Note: En dash (—) = no data available.

Appendix C27.—Southwestern and Unimak Districts, South Alaska Peninsula area, July 2022, seine (July 6–31; harvest = 42,634; $n = 668$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	22	4.3	2.7	5.9	0.9	22	532.7	517.4	548.0	43.6
0.3	336	65.5	61.9	69.1	2.1	336	574.0	570.2	577.8	42.2
0.4	153	29.8	26.4	33.3	2.0	153	584.8	580.0	589.5	36.0
0.5	2	0.4	0.0	0.9	0.3	2	706.5	694.1	718.9	10.6
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						155	567.3	559.8	574.7	56.3
Total	513					668	573.9	571.0	576.9	46.1

Note: En dash (—) = no data available.

Appendix C28.—Southwestern and Unimak Districts, South Alaska Peninsula area, July stratum 1, 2022, gillnet (July 6–24; harvest = 2,027; $n = 244$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval and, estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	11	5.2	2.6	7.9	1.5	11	556.5	540.0	572.9	33.0
0.3	97	46.2	40.6	51.8	3.3	97	561.2	556.2	566.2	29.7
0.4	102	48.6	42.9	54.2	3.3	102	577.3	572.6	582.0	28.5
0.5	0	—	—	—	—	0	—	—	—	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						34	569.0	560.5	577.4	29.9
Total	210					244	568.8	565.6	572.0	30.2

Note: En dash (—) = no data available.

Appendix C29.—Southwestern and Unimak Districts, South Alaska Peninsula area, July stratum 2, 2022, gillnet (July 25–31; harvest = 3,812; $n = 453$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	34	8.3	6.0	10.5	1.3	34	525.9	518.0	533.8	28.0
0.3	232	56.6	52.6	60.5	2.3	232	566.3	563.1	569.5	29.2
0.4	142	34.6	30.8	38.4	2.2	142	580.1	575.9	584.3	30.4
0.5	2	0.5	0.0	1.1	0.3	2	590.0	532.3	647.7	49.5
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						43	557.7	548.4	567.0	37.1
Total	410					453	566.9	564.3	569.5	33.3

Note: En dash (—) = no data available.

Appendix C30.—Southwestern and Unimak Districts, South Alaska Peninsula area, July 2022, gillnet (July 6–31; harvest = 5,844; $n = 697$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	45	7.3	5.6	9.0	1.0	45	533.4	525.5	541.2	31.8
0.3	329	53.1	49.9	56.3	1.9	329	564.8	562.1	567.5	29.4
0.4	244	39.4	36.2	42.5	1.8	244	578.9	575.8	582.1	29.6
0.5	2	0.3	0.0	0.8	0.2	2	590.0	532.4	647.6	49.5
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						77	562.7	556.2	569.1	34.3
Total	620					697	567.6	565.5	569.6	32.2

Note: En dash (—) = no data available.

Appendix C31.—Southeastern and South Central Districts, South Alaska Peninsula area, August stratum 1, 2022, seine (August 1–17; harvest = 35,706; $n = 400$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	55	15.9	12.5	19.3	2.0	55	530.0	522.5	537.6	33.9
0.3	223	64.6	60.2	69.0	2.6	223	565.7	562.7	568.6	26.5
0.4	66	19.1	15.5	22.8	2.1	66	575.6	568.7	582.5	34.0
0.5	1	0.3	0.0	0.9	0.3	1	620.0	620.0	620.0	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						55	544.3	535.4	553.1	39.8
Total	345					400	559.6	556.8	562.4	34.2

Note: En dash (—) = no data available.

Appendix C32.—Southeastern and South Central Districts, South Alaska Peninsula area, August stratum 2, 2022, seine (August 18–31; harvest = 9,793; $n = 301$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	54	20.8	16.5	25.2	2.5	54	540.1	533.2	546.9	30.3
0.3	147	56.8	51.5	62.0	3.1	147	559.0	554.5	563.5	33.2
0.4	57	22.0	17.6	26.5	2.6	57	574.8	568.1	581.5	30.7
0.5	1	0.4	0.0	1.2	0.4	1	601.0	601.0	601.0	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						42	562.2	553.4	571.0	34.6
Total	259					301	559.2	555.9	562.4	34.0

Note: En dash (—) = no data available.

Appendix C33.–Southeastern and South Central Districts, South Alaska Peninsula area, August 2022, seine (August 1–31; harvest = 45,566; $n = 701$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	–	–	–	–	0	–	–	–	–
0.2	109	18.0	15.4	20.7	1.6	109	535.0	529.9	540.1	32.4
0.3	370	61.3	57.9	64.6	2.0	370	563.0	560.5	565.5	29.5
0.4	123	20.4	17.6	23.1	1.6	123	575.2	570.4	580.0	32.4
0.5	2	0.3	0.0	0.8	0.2	2	610.5	594.9	626.1	13.4
0.6	0	–	–	–	–	0	–	–	–	–
Unknown						97	552.0	545.6	558.5	38.5
Total	604					701	559.4	557.3	561.5	34.1

Note: En dash (–) = no data available.

Appendix C34.—Southwestern and Unimak Districts, South Alaska Peninsula area, August stratum 1, 2022, seine (August 15–16; harvest = 18,807; $n = 248$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	52	23.3	18.4	28.2	2.8	52	512.8	505.6	519.9	31.2
0.3	128	57.4	51.7	63.1	3.3	128	555.6	551.3	559.8	29.2
0.4	43	19.3	14.7	23.9	2.6	43	563.8	556.6	571.1	28.7
0.5	0	—	—	—	—	0	—	—	—	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						25	543.3	531.9	554.7	34.4
Total	223					248	546.8	543.1	550.5	35.1

Note: En dash (—) = no data available.

Appendix C35.— Southwestern and Unimak Districts, South Alaska Peninsula area, August stratum 2, 2022, seine (August 17–31; harvest = 10,017; $n = 359$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	51	16.1	12.5	19.7	2.1	51	519.9	512.0	527.8	34.1
0.3	150	47.3	42.5	52.1	2.8	150	556.7	552.6	560.8	30.1
0.4	116	36.6	32.0	41.2	2.7	116	567.4	563.2	571.5	27.3
0.5	0	—	—	—	—	0	—	—	—	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						42	549.6	539.1	560.1	41.4
Total	317					359	554.1	551.1	557.1	34.7

Note: En dash (—) = no data available.

Appendix C36.— Southwestern and Unimak Districts, South Alaska Peninsula area, August 2022, seine (August 15–31; harvest = 28,821; $n = 607$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	—	—	—	—	0	—	—	—	—
0.2	103	19.1	16.2	22.0	1.7	103	516.3	511.0	521.6	32.7
0.3	278	51.5	47.8	55.1	2.2	278	556.2	553.3	559.1	29.7
0.4	159	29.4	26.1	32.8	2.0	159	566.4	562.8	570.0	27.6
0.5	0	—	—	—	—	0	—	—	—	—
0.6	0	—	—	—	—	0	—	—	—	—
Unknown						67	547.2	539.4	555.1	38.8
Total	540					607	551.1	548.8	553.4	35.0

Note: En dash (—) = no data available.

Appendix C37.– South Alaska Peninsula area, August 2022, gillnet (August 1–31; harvest = 7,048; $n = 434$). Estimates of age composition and mean length (mid eye to tail fork [METF] in mm), 90% confidence interval, and estimated SE or SD.

Age class	Age composition					Length (mm) METF				
	Number	Percent	90% CI		SE	Number	Mean	90% CI		SD
			5%	95%				5%	95%	
0.1	0	–	–	–	–	0	–	–	–	–
0.2	67	17.2	14.0	20.4	1.9	67	540.0	533.7	546.3	31.1
0.3	229	58.9	54.7	63.0	2.4	229	562.1	559.8	564.4	21.2
0.4	93	23.9	20.3	27.5	2.1	93	578.1	573.4	582.9	27.6
0.5	0	–	–	–	–	0	–	–	–	–
0.6	0	–	–	–	–	0	–	–	–	–
Unknown						45	560.5	553.3	567.6	29.1
Total	389					434	562.0	559.8	564.2	27.6

Note: En dash (–) = no data available.